

15. GENE ↪

Functional segment / region of DNA known as gene.

All the genes are DNA but DNA may or may not be gene.

OR

Unit of heredity which is responsible for inheritance and appearance of characters.

↪ These genes name coined by "Johannsen" [1909]. Mendel used term "element" or "factor" for gene. Morgan first used symbol to represent the factors.

Dominant factors are represented by capital letters while recessive factors by small letters.

16. ALLELE ↪

Alternative forms of a gene which are located on same locus [Position] on the homologous chromosome and segregate to same character known as allele.

Term allele was coined by "Bateson".



⇒ All the alleles are gene but gene may or may not be allele.

Allelic genes are always present on homologous chromosome but all gene which are present on homologous chromosome are not allelic.

⇒ Those genes which are present on non-homologous chromosome known as non-allelic gene.

⇒ Allelic genes show two types of combination :-

17. HOMOZYGOUS ⇒

similar kind of allelic gene.

eg: = TT , tt , RR

18. HETEROZYGOUS ⇒

Dissimilar allelic gene.

eg: = Tt

⇒ The term homozygous and heterozygous are coined by "Bateson".

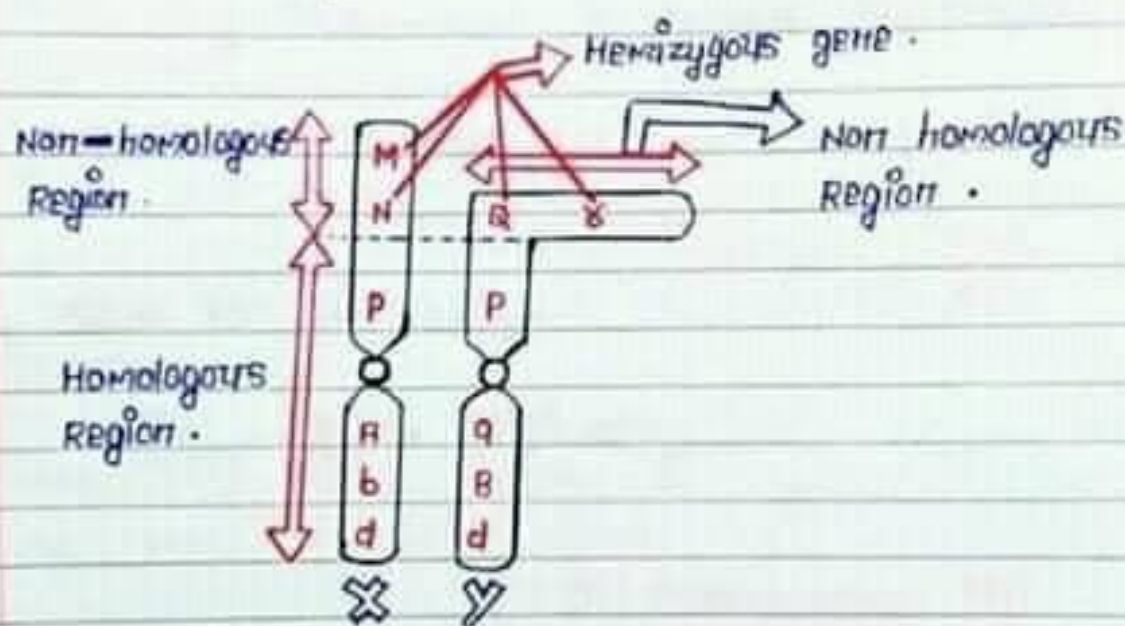
19. HEMIZYGOUS ⇒

If any diploid organism contains only one gene of a pair then individual said to be hemizygous.

eg: = Male individual is always Hemizygous for sex-linked gene.

OR

In Human male gene present on non homologous region of the X and Y chromosome, that is hemizygous.



20. PHENOCOPY ↷

If different genotypes are placed in different environmental conditions then they produce same phenotype. Then these genotypes are said to be phenocopy of each other.

eg: = $TT \xrightarrow{\text{Sunlight}} Tall$
 $tt \xrightarrow{\text{Sunlight}} Tall$ Phenocopy

21. PURE LINE / TRUE BREED \Rightarrow

Group of the homozygous organisms [at least for 1 trait] arises by repeated selfing in self-pollinated organisms known as pure line / true breed.

Mendel used 14 - true breed in their experiment.

22. INBRED LINE \Rightarrow

Group of the homozygous organisms arises by crossing between closely relative member.

23. INBREEDING \Rightarrow

Crossing between closely relative member.

It \uparrow homozygosity, continuously recessive gene start to express which results to loss of Hybrid vigour / Heterosis, i.e. Inbreeding depression.

24. OUTBREEDING \Rightarrow

Crossing between genetically distant individuals.

OR

Crossing between the remote member. It \uparrow heterozygosity which results to \uparrow in the Hybrid vigour / Heterosis, then hybrid vigour is more superior than parents.

25. EUGENICS ↪

It is the sets of beliefs and practices which aims at improving the genetics quality of the human beings.

26. EUTHENICS ↪

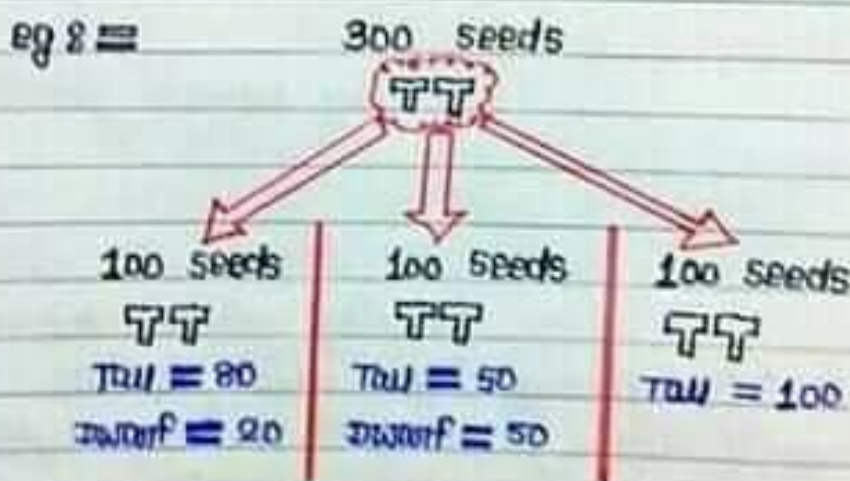
Improvement of human functioning and well-being by providing ideal hygienic environment is known as eutherics.

27. EUPHENICS ↪

Phenotypic improvements of human being by applying knowledge of the genetic engineering / medical science.

28. PENETRANCE ↪

Percentage phenotypic expression of a associated phenotype known as penetrance.



↪ This population show penetrance of genotype.

29. EXPRESSIVITY ↷

Degree or extent upto which any genotype express phenotypically is known as expressivity.

eg: = different shades of red colour in eyes of drosophila.

NOTE: =

Such penetrance and expressivity is because of present of some kind of modified gene and suppressor gene.

30. FORWARD GENETICS ↷

Tracing out of those genotype which phenotype is already known called Forward genetics.

Phenotype \Rightarrow Genotype

eg: = Mendelian genetics.

31. REVERSE GENETICS ↷

Tracing out of those genotype which phenotype / product still unknown called Reverse genetics.

Genotype \Rightarrow Phenotype

eg: = Human Genome Project.

FERTILIZATION IN FLOWERING PLANTS

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The fusion of male gamete with female gamete is called "fertilization".

→ 1st of all, Fertilization was discovered by "Strasburger" [1858] in "Monotropa" plant.

The process of fertilization is completed in the following steps :-

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A. GERMINATION OF POLLEN GRAINS =

After pollination, pollen grains germinate on the "stigma". They absorb moisture and sugar contents from stigma and swell up. The intine of pollen grain grows out through the any one germ pore of exine, in the form of tube like out growth which is called "pollen tube".

→ "Boron" and "calcium" elements [mainly Boron] are essential for growth of pollen tube.

These elements also help in pollen grain germination and pollen tube formation.

→ Best temperature for growth of pollen tube is "20-30°C".

⇒ Pollen tube shows "apical growth" and "chemotaxic movement".

⇒ ** Generally there is single pollen tube formation [Monosiphonous condition] in most of Angiosperms [Capsella].

But in family of "Malvaceae" and "Cucurbitaceae" more than one pollen tubes are formed [Polysiphonous condition].

⇒ When pollen tube comes down from the stigma into the style, then first of all vegetative nucleus enters, into pollen tube then it is followed by generative cell.

The tube nucleus [vegetative nucleus] always occupies the terminal position in pollen tube. The vegetative nucleus controls the growth of pollen tube. Meanwhile the generative cell divide "mitotically" to form "two male gametes".

⇒ ** Both of the male gametes are "non motile".

⇒ ** The solid style, has a core of transmitting tissue while in hollow style the stylum canal is lined by glandular cells [Glandular tissue].

B. ENTRY OF POLLEN TUBE INTO OVULE =

Now the pollen tube enters in the ovary at that time when ovule becomes mature.

Inside the ovary "obstructor" guide the passage of pollen tube towards micropyle.

- In a mature ovule there are "3-paths" for entry of pollen tube :≡

i. Porogamy ↷

When entry of the pollen tube into ovule through the "micropyle" is called "porogamy".

Most common method.

eg:≡ Most of Angiosperms [Capsella]

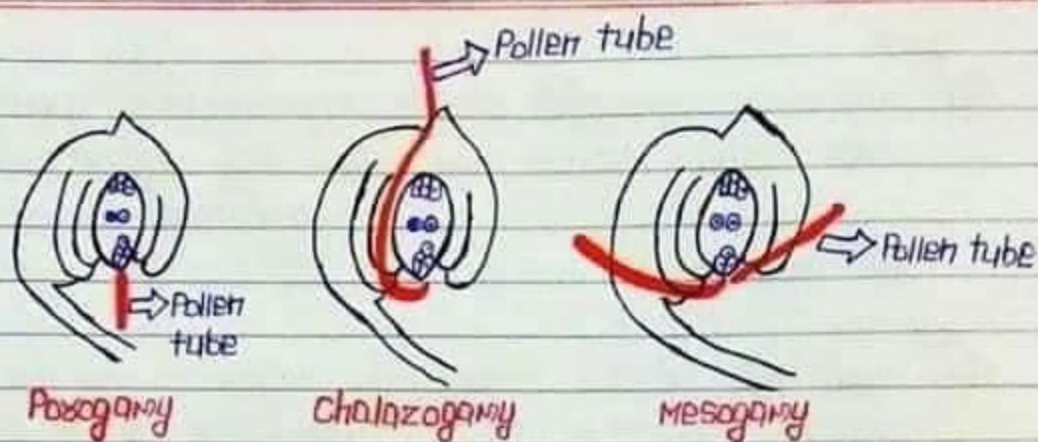
ii. Mesogamy ↷

When pollen tube enters into the ovule either through "integuments" eg: [Cucurbita] or through the "funicle" [eg: Pistacia] is called mesogamy.

iii. Chalazogamy ↷

When pollen tube enters into the ovule through the "chalaza" is called "chalazogamy".

This process was discovered by "Tserub" in "casuarina" plant.



- ☞ All the events from pollen deposition on the stigma until pollen tube enters the ovule are together referred to as pollen pistil interaction.
- ☞ Pollen pistil interaction is a dynamic process involving pollen recognition followed by promotion or inhibition of the pollen.

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☐ ENTRY OF POLLEN TUBE INTO EMBRYOSAC =

Pollen tube can enter into ovule through the any passage but inside embryosac, it enters only through the "egg apparatus" cell [i.e. synergid].

After the entrance inside the ovule, it grows towards the egg apparatus because synergid cells secrete the chemical [hormones] which attracts the pollen tube. It means "pollen tube" shows "chemotaxic movement" in ovary.