Locus - fixed place, Sweet pea - discovered
Loci

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Complementry gene or complementry factor :-

White flower (CCpp) × White flower (ccPP)

CCpp — R/D — ccPP

(Cp) (Cp) (cP) (cP) gametes

F_1 gen — (CcPp) ♂ × ♀ (CcPp) Purple

R/D R/D

Fusion - (CP) (Cp) (cP) (cp) (CP) (Cp) (cP) (cp) gametes

♂ / ♀	CP	Cp	cP	cp
CP	CCPP +	CCPp +	CcPP +	CcPp +
Cp	CCPp +	CCpp ω	CcPp +	Ccpp ω
cP	CcPP +	CCPp +	ccPP ω	ccPp ω
cp	CcPp +	Ccpp ω	ccPp ω	ccpp ω

+ = coloured
ω = white.

F_2 - Gen

Phenotypic ratio = 9:7

Two pairs of genes present on seprate Locus that inter act jointly to produce only one phenotypic character. It means that these genes are complementry to each other.

In sweet pea (Lathyrus odoratus) purple colour of flowers developed as a interaction of two dominant gene. In absence of dominant gene C or P only white flower develop If both dominant genes are absent then white flower is also developed

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Scanned with CamScanner

plumage-

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Both the genes C & P synthesised anthocyanin pigment (purple). It means that pigment anthocyanine is the product of two bio-chemical reaction. In the figure given above two different plant bearing genes (CCpp) & (ccPP) indicate white flower. When these two plant bearing these genes two different genes are crossed through chequer board then 9 coloured flower & 7 white flower are produced in F_2 - generation.

Therefore, a plant having ccPP, ccPp, CCpp, ccpp having only white flower. If the plant having (ccPP), (CcPp), CcPP coloured flowers.

Coloured flower = 9 purple

White flowers = 7

Phenotypic ratio = 9:7

Epistatis :-

White leg horn (IICC) × White ply mouth (iicc)

P

R/D

(IC) (IC) (ic) (ic) gametes

F_1 - generation (Ii Cc) ♂ × ♀ (Ii Cc)

white white

R/D R/D

(IC) (Ic) (iC) (ic) (IC) (Ic) (iC) (ic) gametes.

F_2 - generation

♀ \ ♂	IC	Ic	iC	ic
IC	IICC W	IICc W	IiCC W	IiCc W
Ic	IICc W	IIcc C	IiCc W	Iicc C
iC	IiCC W	IiCc W	iiCC W	iiCc W
ic	IiCc W	Iicc C	iiCc W	iicc W

Ic - white

CC - white

II - C

I - Color

iicc - white

Phenotypic ratio = 13 : 3
white horn - 13
coloured - 3

When two constrasting characters are brought together, single dominant allel mask the activity of other allel.

In poultry when white leg horn is crossed with white ~~fly~~ fly mouth, in F_1-generation, all the off springs are white ~~seed~~ when these two offsprings are crossed through the checker's board then in F_2-generation 13 white & 3 coloured are produced.

I - inhibiting factor, i = its recessive allel
C - coloured factor, c = its recessive allel
The white is produced.

a) When both colour & inhibiting character are present - white
b. When both colour & inhibiting character are absent - white
c. The colour factor is absent - ccII or ccIi

3) Multiple Allele :-

Allele - The various forms of a gene are called allele.
eg :- blue colour & black colour of eye are two alleles of the eye colour gene.

Multiple Allels :-

Multi - Many
Allele - Various forms of gene

When three or more alleles are responsible for a single characteristics they are called multiple allele.

All these allele occupy the same specific locus on the chromosome.

In diploids, only two alleles can be present at a time on the homologous chromosome.

In human blood type, inheritance is based on three alleles i.e I^A, I^B, i. I^A & I^B are dominant & i is recessive.

Antigen - ~~foreg~~ foreign substance.

Inheritance of Blood type :-

There are four types of blood group. i.e A, B, AB & O.
A & B blood group contain two types of antigens (glyco protein)
AB blood group contain the antigens.
O blood group does not contain antigen.

The blood group character is controlled by a set of three alleles. — I^A, I^B, i

a. The gene which produces Antigen - A is denoted by I^A — Blood group A
b. The gene for Antigen - B is denoted by I^B Blood group B.
c. The gene absence for both the antigen I^A or i - Blood group O.

Phenotype (Blood group)	Genotype	Antigen
Type - A	I^AI^A or I^AI^o	A
Type - B	I^BI^B or I^BI^o	B
Type - AB	I^AI^B	A & B
Type - O	I^oI^o or ii	Absent

eg:- If a blood group - A (male) is crossed with blood group - B (female)
Heterozygous for male blood group A — I^AI^o
Heterozygous for female blood group B - I^BI^o

Hetero zygous for male blood group - A (I^AI^o)

Heterozygous for female blood group B — I^BI^o

♂ / ♀	I^A	I^o
I^B	I^AI^B AB	I^BI^o B
I^o	I^AI^o A	I^oI^o O

Result : I^AI^B — Blood group - AB
I^BI^o Blood group - B
I^AI^o Blood group - A
I^oI^o Blood group - O

fig:- crossed between male I^AI^o & female I^BI^o

2. If a blood group of male is AB is crossed with a blood group female - B.

Heterozygous for male blood group - AB

Heterozygous for female blood group - B - I^BI^o

♂ / ♀	I^A	I^B
I^B	I^AI^B	I^BI^B
I^o	I^AI^o	I^BI^o

Result :-

I^AI^B - Blood group - AB
I^BI^B - Blood group - B
I^AI^o - Blood group - A
I^BI^o - Blood group - B

Fig :- crossed between male I^AI^B & female I^BI^o.

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Linkage :-

With the rediscovery of Mendel's law of inheritance in 1900, Geneticts were agreed but through out the world. But BATESON & PUNNET (1906) do not agreed with Mendel's law of inheritance (law of independent assortment) they experimented on sweet Pea (Lathyrus odoratus).

Bateson & Punnet explained that when the two genes (allel) such as A & B come from same Parent as in cross AABB x aabb. They tend to remain togethes in successive generation. Which they called coupling.

When the same gene (allels) come from different parent AA bb x aaBB. They tend to remain in separate in Progeny which they called repulsion.

T. H. MORGAN (1910) explain the coupling & repulsion as linkage while working on Drosophila melanogaster (fruit fly).

(13)

Link
gene
ch → gamete

classmate
Date
Page

Defination:- "The tendency of linked gene in the same chromosom to enter the gametes together during hereditary transmission."

genes show linkage because they are present on the same chromosome. New combination of linkaged gene are called re combination.

Linkage can only takes place between genes in same chromosome. The group of linked gene are called linkage gr

No of linkage group usually conside with haplied number of chromosome. Coincide

eg:- If the linkage group is 4 in Drosophila melanogaster the haplied no - n = 4

2. In Maize the linkage groups is 7 then haplied no is n=7.
3. In Pea the linkage group is 10 & then haplied no is n= 10

MORGAN further suggested that strength of linkage depends upon the distance between the coupling

Types of linkage :-
There are two types of linkage.

1. Complete linkage
2. Incomplete linkage

1. Complete linkage :-
The non cross over is 100% genes show complete linkage are transmitted together in the Parental character combination to the same gamete.
eg:- Drosophila male