Unit II Mendelian genetics

an it's extension module name

supplementary gene interaction myself,

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Outline includes introduction to

supplementary gene interaction,

examples of supplement gene.

interaction learning outcomes.

Explain supplementary gene interaction.

Cites the example for

supplementary gene interaction.

Now, in the last module,

we have already seen that

the genes are interacting.

In order to express a certain character.

Here we're going to learn about

interaction that is referred to

as supplementary gene interaction.

This interaction involves two

different types of genes in which one.

Type can express itself in dependently

but other has no expression of its own.

When two such genes interact

they produce a new character.

Now these two interacting genes are

present on two different loci which can

be present on the homologous chromosome.

Or they can be present on

nonhomologous chromosome.

Now let us understand it with

the help of an example that is

coat color in mice where in.

We have three common colors.

The first one is Black,

second is albino,

and the third one is agouti.

That is wild type with yellow

hair and black base. now here.

Black color is determined by

the presence of dominant gene.

C Albino is controlled by dominant

Gene A and agouti is produced due to

the interaction of dominant gene A and C.

Now here we need to understand that.

Gene A does not show any visible

effect if it is alone,

but Gene C is able to express in dependently.

Now we'll see how the cross

is being done here.

We are taking the parents

with the phenotype black,

and albino which will be forming the gametes,

and they will form the F1

individuals phenotypically.

They will be expressed as agouti.

Due to the presence of heterozygous

C and A in the dominant

form when the F1 individuals are

allowed to self they will form the

gametes and this gametes will fuse

and they will form the Genotype.

Now when they are assigning the

phenotype we need to understand that

Gene C is expressing itself independent

of A Whereas A will not be able to express.

Itself independent of C.

And when Gene C&A interact with one another,

they will form the agouti.

phenotype.

Now let us see how we are getting it.

Now if we check over here there

are nine individuals which

are showing agouti phenotype,

3 black and four albino.

Now in this case the ones with the

black phenotype are with the Genotype.

Having either dominant in the homozygous

form or in the heterozygous form so

it will be expressing independent

of A and all the Genotype wherein

we can see albino being expressed.

Their C will be in its

homozygous recessive form.

That's why a will be getting

expressed as albino.

The ratio that is obtained is 9 :3:4.

9 agouti, 4 are

black and four are

albino. Now in the cross between

black and albino mice one thing becomes

apparent that the two independent

pairs of genes have interacted in the

production of the phenotypic trait

that is the coat color in which a way

that one dominant reduces its effect.

Whether or not the second A is present.

But II gene a can produce.

Its effect only in the presence of the first.

These jeans that is A and C are

termed as supplementary jeans.

The supplementary ratio obtained

is 9 : 3:4 .

That is a modification of dihybrid

ratio wherein 9 :3:3:1

is the normal ratio that gets

modified as 9:3:4

is 3 and 1 are combined as four in the.

Supplement ratio another example

is flower color in Snapdragon that

is antirrhinum majus wherein we

are getting three colors yellow,

orange,

ivory and white which are due to

the production of certain pigments

which are controlled by gene N&P.

Now yellow color is produced by

the action of dominant gene N&P.

Ivory is due to the presence of

dominant gene and recessive P.

And white is due to the action of

recessive Gene NNP wherein there is no

biosynthesis of pigment and it will

remain inactive expressing as white color.

Now let us understand with the help of

across wherein we are taking parents

with homozygous dominant N&P and

recessive homozygous NNP that is white.

So they will form the gametes and

they will lead to the formation

of F1 generation which will have.

Yellow orange.

Yellow orange and white type and they will

be expressed as yellow orange flowers

when the F1 individuals are allowed to self,

they will form the gametes an the gametes

will be fused to form the Geno type.

Now when we are thinking about the

phenotypic expression we need to

understand that the dominant NNP

when they are present either in

the homozygous form or heterozygous

for in the Geno type they will.

From the yellow color.

Now when N gene is present in it at

heterozygous form with recessive P,

It will lead to the formation of

ivory color and then if N

is present with either homozygous

dominant P or heterozygous dominant.

P will lead to the formation of

white colored flowers,

so we get the ratio 9:3:4.

These nine will

be orange yellow flowers.

Three will be ivory flowers and

four will be white colored flower.

So here we have seen about the

supplementary gene interaction,

wherein the interaction involves

two different types of genes,

in which one I can express itself

in dependently,

but other has no expression of its own.

When two such genes interact

they produce a new character.

Such interaction is called

supplementary gene interaction,

and the ratio obtained is 9:3:4.

These are some of the references for

your further reading, thank you.