Hello students, my name is Diksha Gaunker, Assistant professor in Botany, Government College of Arts, Science and Commerce, Quepem. Coming to program Bachelor of Science Third year. Subject botany, Semester 6, Course code BOC 108. Course title, Cytogenetics and plant breeding, Title of the unit Mendelian Genetics and its extensions. Module name - dominant and recessive gene interactions. Outline- we are going to learn about dominant and recessive gene interaction, which has got ratio 13: 3 and we are also going to learn different examples under these learning outcomes. At the end of the module you will be able to describe dominant and recessive gene interaction. Explain dominant and recessive gene interaction with examples before going to start with the actual topic. Let us learn about certain terminologies so First let us learn what is gene interaction? Gene interaction is the coordinated effect of two or more genes in producing a given phenotypic trait. Epistasis: It is a interaction of non-allelic gene where the effect of one gene is masked by another gene, which results in either suppression of effect or they combine to produce new trait. Next one epistatic gene epistatic gene refers to the genes which suppresses or masks the effect of the other genes which are present on another locus hypostatic genes. These are the type of genes which are being suppressed or masked by the epistatic.

Genes homozygous an Organism having two similar genes for a particular character.Epistatic gene: A gene or locus which suppressed or masked the action of a gene at another locus is called as epistatic gene. Hypostatic gene: The gene or locus which was suppressed by a epistatic gene is called hypostatic gene. Homozygous: The organism having 2 similar genes for particular character in a homologous pair of chromosomes (AA, aa). Heterozygous: An individual having both dominant and recessive genes for traits or characters of an allelic pair (Aa). Kinds of Epistatic gene interactions are

1. Dominant epistasis (12:3:1)
2. Recessive epistasis (9:3:4)
3. Duplicate gene with cumulative effect (9:6:1)
4. Duplicate recessive gene (9:7)
5. Duplicate dominant gene (15:1)
6. Dominant and recessive gene interaction (13:3)
7. It is also known as Dominant suppression.

In todays module we are going to learn about Dominant and recessive gene interaction which has a ratio 13: 3. A the dominant allele of one gene locus (A) in homozygous (AA) and heterozygous (Aa) condition and the homozygous recessive allele (bb) of another gene locus (B) produce the same phenotype, the F2 phenotypic ratio becomes 13:3 instead of 9:3:3:1 which is expected in normal dihybrid cross.

Genotype AABB, AABb, AaBB, AaBb, AAbb and Aabb produce same phenotype and genotype aaBB, aaBb, aabb also produce another same phenotype. We get capital A coming to smallest a. Now here small a becomes epistatic over hypostatic genes. So here are a does not inhibit capital B or small b. small a and small a becomes recessive inhibitor.

Let us learn example of pigmentation: In rice *Oryza sativa* character- in pigmentation in rice.
So here we have grain color - green and purple. These are the genotypes for green. These are the phenotypes for purple, so the green grains shown in the picture and the purple pigmentation of the grains shown in the picture coming to the cross. So, we have parents with the green pigment with the Geno type capital G Capital G Capital T Capital T and the other parent green pigment. We get the offspring of F1 generation, we having a green pigment for generation F1 is then self-pollinated, and these are the gametes of F1 generation method of interaction, so capital be capital P capital T, small p becomes epistatic over these capital G Capital G Capital.

So, in the phenotypic expression of the allele, we get P and green colored grains will be formed. Coming to the second one small p becomes epistatic over Capital G, Capital G and Capital G. In the phenotypic expression we get capital G and purple colored grains having pigmentation similarly small p is epistatic over small G and Capital G. In the phenotypic expression we get small G. And it results in the formation of green colored grains in the F2 generation. So, this is a dihybrid cross, so we have self-pollinated as one generation. So, we get 13 green and three purple pigmentation in the F2 generation

Coming to the second example, pigmentation in Primula. So here is the white colored flower is a colorless precursor. In the presence of a product of Gene A, it results in the formation of white colour flowers whereas when the product of gene B interferes when it is present it results in the formation of this malvidin color or a blue color flower. Coming to the cross. We have the parents having homozygous parents having capital A Capital A Capital B Capital B, then we have small a small a and small b small b which results in the formation of this malvidin colour. So, in the parental generation, we have the Primula having white flowers which has got capital A Capital A and Capital B Capital B second parent has got recessive small a small a and small b small b When these fuses it results in the formation of an offspring having white colored flowers and it has got Genotype capital A small A capital B small B. So, this is all of spring of F1 generation. When the F1 generation progenies are self-pollinated, it results in the formation of these gametes – capital A capital B capital A small b small a capital B small A small b. Similarly here are the same gametes and the fusion occurs. We get 13 white color Primula flower and 3 blue flowers.
It results in giving the phenotypic ratio of after second filial generation as 13: 3

Coming to the summary, we have learned about epistatic and hypostatic gene, dominant recessive gene interaction having 13:3 ratio. Example one in rice pigmentation in grains and flower colour in Primula.

These are some of the references. Thank you.