## PRINCIPLES OF INHERITANCE

Gregor Mendel experimented on Garden peq or Pisam sativum In garden peq mendel selected seven contrasting characters of the contrasting cha-

	characters	Dominant	Recessive	
/	seed colour	Yellow		
?	seed shape	201	Wainkled	
	Pod Soloyrpose	Green	Yellow	
-	Pod eshapebirdy	inflated	constricted	
00	Flower colour	Violet	white	
		Axialol		No. of St.
3	Plant height m	Tall d	Dwarf.	William Children

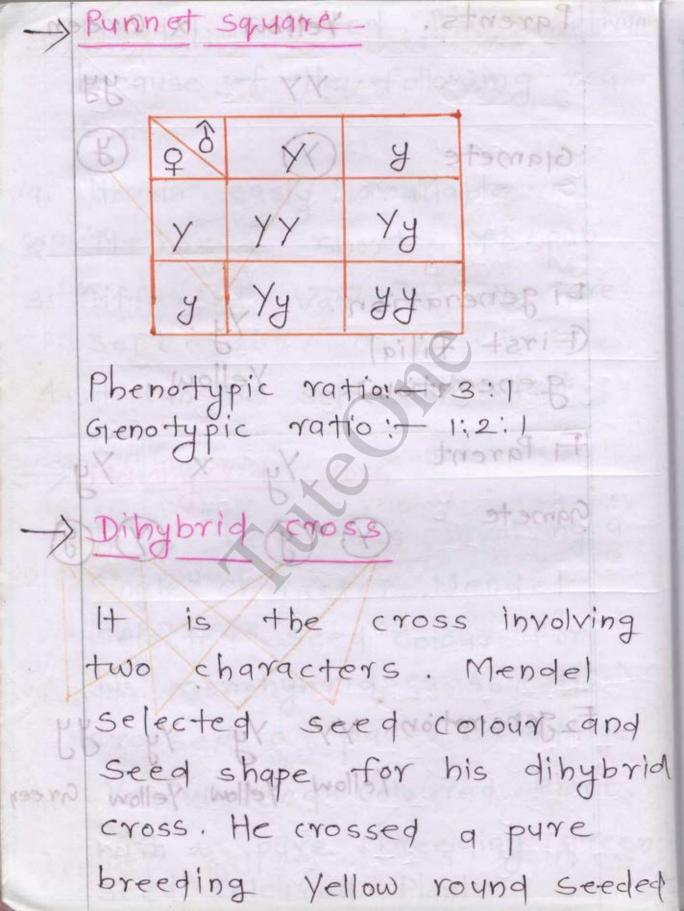
5

Mendel selected Pisym sativum because of the following reasons. ad. officience asly savallable and Quilte has a short lifespan 3. Different varities are preched Geven contrastitions hat 4. It can be self Pollinated Monohybrid Cross involving 9

It is the cross involving 9

Polansingle character. Mendel wo selected seed colour for point his monohybrid cross bottet erossed a pure breeding paintyellow seed coloured woPlants with a pure breeding green seed cologred Plant.

Parents. x Green. Yellow Gamete Fi generation (First filia) Yellow . generation) Fi Parent agmete cross pholyng ters. Mendel = F2 generation yy yy Mrdydib eid Yellow Yellow Yellow Green cross. He crossed a pure preeding Jellow Lohud Reeded



Plant with a breeding pyre seeded Green wrinkled YYRY YYER Plant Vellow Wollow Wolley Round Round Roynd Round Parents. YellowRound X GreenWrinkled YYRR Vellow Keilon Vellow yyrr BURDS 0000 Monthspa A Hoy SyRE YURY (42) Glametes Vellow ponoy Pano8 banba pana YARY LIKE XHER Yy Rr YELD XALEED an cen Hamphed Round genera Yellow Round. 8.8.P OFFIC Fi Parent 1 YyRr X Yy Br Grametes (YR) (Yr) (YR) (Yr) (YB) (Yr) (YB) LALLA - 5

The state of the s					
2 3	YR		yh ass	yr	
YR.	YYRR Yellow Round	YYRY Yellow Royng	YyRR Yellow Royng	YyRY Yellow Round	
Wash Y.	YYRY Yellow Round	Yyrr Yellow Wrinkled	YYRY Yellow Roynd	Yyrr Yellow Wrinkled	
yB	YyRR Yellow Round	Yellow Round	yy RR Green Round	yyRr Green Round	
yr	YyRY Yellow Round	Yyrr Yellow Wrinkles	yy Rr Green	yyrr Green Wrinkled	
phenotypic ratio: - 9:3:3:1					

ink e

phenotypic ratio: - 9:3:3:1

Genotypic ratio: -1:2:1:2:4:2:1:2:1

YYRR-1 YYRR-2 YYRR-1 YYRr-2 YYRr-4 YYRr-2 XYYYY XYYYY XYYYY XYYYY YYYY-1 Law of Mendelsai troses rento 1. Law of Dominance or 34508 6 when two factors are involved ng in a cross one factor will mask the effect of other 11- is backeros The expressed factor is known as Dominant and other one is Reccessive. 2. Law of segregation. when two factors are involved in a cross the factor pairs Segregates during the formation of gametes. It is based on monohybrid cross. 3. Law of Independent assortment It is based on dihybrid cross When two characters are involved in a cross the factor pairs -

assort independent of each other -> Backcross and Test cross when the fi hybrid is crossed with anyone of its parent. It is backcross. When the FI is crossed with its Recessive parent. It is Test cross. The test cross is used to find out ynknown genotype of individual. ro Monohybrid test cross? based f. b. x admetices. Hie based 3- Law o(B) dependent (B) ortment ssorp bird bird on send al th when two chanciers are involved Yellow Yyotop, yy Green on

se Dibybrido testo crossys plants there was the yar the best (YR) (Yr) (yB) (yr) and (yr) tides ssel with a cupite coloured plans they objained PINK Popelof John Hoen H YyRr Yyrr yyRr yyRr Round Wrinkled Round Wrinkled. Plant intition of 1:1:11. -) Other Patterns of Inberitance (Non-Mendelian inheritance) 1. Incomplete dominance. It was observed by carl corrent in Mirabilis jalapa (4°clock plant) and also in Antirrhinum/snap

dragon of dog flower. In these plants there was two varrities of flower colour Red and white. When a Red flowered plant is crossed with a white coloured plant they obtained Pink flow ered plant, when it was self fertilised they obtained Red flowered, Pink flowered and white flowered Plant in the ratio of 1:2:1. It is due to incomplete dominance. The red is incompletely dominant over white. H was observed by carl corren in Mirabilis jalapa (Aclock plant and also in Antivipinam/snap

Parent Regula X subite ATTELES are CARES OF REDES. Glamete (R) e than etul s known as e isno . generation. Br Pink Fi. Parent Rr gamete RR Rr Red Pink Pink white 0008 group is controlled pd I T IB and example for multi ale alleliem.

## 2. Multiple Allelismans topical

Alleles are copies of genes. when a character is controlled by more than a two alleles. It is known as multiple allelism.

T	^ ^
AAA	ATA, TAi
B B J b I	BB, IB;
	I <sup>A</sup> I <sup>B</sup>
o aib	فف

Blood group is controlled by the alleles IA, IB, and i. so it is an example for multi ple allelism.

In AB group In and I express together so known as codominance. and Depromosomes Chromosomal basis of inberi tance Jasan (Sutton and Bovery bypothesis) Sytton and Bovery observed the behaviour of genes and chromosomes. And observed the following Similarities. 1. The genes and chromoso. mes gre found invopaired al coiter sition no part tapla 9. Genes and chromosomes Separate during the forma tion of gamete.

3. The paired condition is restored after fertilization. Cod ominance 4. Genes and chromosomes install show independent assort ment on Based on these similarities Sytton and Bovery proposed that chromosomes are the basis of inheritance Q A pea plant with green pod coloured and round seed was crossed with yellow pod coloured wrinkled seeded plant find out the ratios in d. eleves and chromosomes separate during the forma tion of samete.

Yellow Parent Gireen Wrinkled Roynd g R SIR ggrr GIGIRR GARK GIBRY GGRR (77) Gamete Houne LL BO LABOR GIGIKY allerd anced MAINK GIGRY. Round Warnkler Figeneration. Green Round RABE ARBB 03 (O) Yellow Yellow Round Round GIGRY X GIGRY gametes GR Gr GR Gr GR Gr GR 1:8:8:6 Tipiter adaptoused Genoty pic 19 110: - 11211 1214 2:1121

	10			And The Land
23	GIR	Gr Gr	gR	gr
GIR	GGRR Green Round	GGRY Green Round	Gg RR Green Round	Glyeen Round
GIY	GIGIRY	GIGITY	GIGRY	Gig rr
	Giveen	GITEEN	Giveen	Green
	Round	Wrinkled	Round	Wrinkled
gR	GIGRR	GIGRY	ggRR	ggRr
	Green	Green	Yellow	Yellow
	Round	Round	Round	Round
gr	Gg Rr	Ggrr	gg Ar	ggrr
	Green	Green	Yellow	Yellow
	Roynd	Wrinkle	Round	wrinkled

Wellow

phenotypic vatio: - 9:3:3:1
Genotypic vatio: - 1:2:1:2:4:2:1:2:1

Linkage op revo stasmes Genes on a single chromosomen gressaid to be linked together. The genes on a single chromosome gre inheri tanted into a single game te. As the distance blw the genes increases linkage decreages. It is known as inco-mplete linkage. As the di-Stance blu genes decreases linkage increases It is known as complete linkage Crossing over and Recombination crossing over is the overla-Ping of chromosomal segments. The region where chromosoma)

segments over laps prison + chiasmata. Chromosomal segments breaks at chiasmata exchange of chromosomal segments occur when it rejoints It is known as recombination. Recombination increases - Variation. As the distance esemblw genes increases linkaaward ge decreaces and recombi nation increases. As the distance blu genes decreases linkage increases and recombination decreases. Ping of chromosomal segments. The region where chromosoma

under NonRecomb Recom Recombingot Recombinat Paren Tal haitano rossing

- Mytation : Mytations gre the sydden - beritable change . Mutations gre of two type. Point mytations and chromosomal mutations. Point Mytations Voiene muta They gre the mutations in genes it will not alter the nymber and structure of chromosome. 9. Chromosomal mytations. They are the mutations which causes structural or numerical change. It is of

two types. asie revalos chromosomal abernations and Ploidytenterty biol9 1. chromosomal aberration. They are the structural changes in chromosomes. It is of 4
types. Indexs and 79 (9). Deletion. Deletion. It is the lose of a seg-- ment of a chromosome. ATGC - ATG (b) Addition or Duplications. segment of chromosometlis as addediords al -> ATGCGC ATGC

contraversion 2998to out A segment of chromosome is invertedubie! ATGC ATCG MOTO They are the structural change (d) Translocation It is the exchange of chromosomal segments. 1234 12GC AT G C PATA Q. Ploidy ov & Northpha (d) It is the nymerical changes in chromosomes. It is of two type. AT GIC GIC AT GIC

mica) Euploidy malando M H is the change in chroof chromosomes. on -n -> Monoplaidy / Haploid en +n - ) Triploidy 720+0A an + an -> Tetraploidy Polyploidy Cbs Aneypholdy woods som soll It is the change in chromo some number as one or Mc chenism more chromosomes. antl > Trisomy 2n-1 -> Monosomy Pn-P > Nullisomy. Emple A+XX A+XX male

-> Mechanism of sex determing We have two types of chromosome Autosomes and Allosomes or sex chromosome. Allosomes controlls sex and Autosomes controls other body characters. The mechanism of sex determination in hyman beings and in drosophila is xx-xy me chanism. move chromos Female Male A+XY EmosixT (A! +XX A+X) (A+X) umeillott & 9-09 Female A+XX

A+XX male

Males produces two types of gametes. So they are heterogametic and females are homogametic -Mechanism of sex determination mechanism. insects is xx-xo Male Female A+XO WX+X A+XX (A+X) (A+X)temake are peterolamenc and make the popagametric A+xxA+XO

female Male.

Malec are beternaame

Males are heterogametic

of sex determi--) Mechanism nation in Birds is ZZ-ZW mechanism. Tomporated male present supported to the male Atzz > > > = majana + zw A+Z A+WMale A+ZZ A+ZW male -female ... gre heterogametic females and males are homogametic. ATTOXEA XXTA Male temple. Males are beterogamente and females are nomo gamptic.

Disorders. Mendelian Disorders. 1. Haemophilia x = His qh x -chromosomal recessive disease. It causes defective blood cloating. It is a royal disease. It is Inherited from a person to its grandson. So known as criss-cross inheritance. the emotion of the ob xbx Diseased female sch sc -s carrier female so ochy Disteased male. Valine so their RBC becomes sin sickle shape and will not aple to transport ox 88 en.

and seral road -axh xy scxhxy x x x xy 3chy H is a veg disease It is of Sickleced anaemia Harmoglobin has two poly peptid chains & and B. lo the & chain at the 6th position aminoacid is alutamic acid. In diseased persons it is replaced by Valine. So their RBC becomes sin sickle shape and will not able to transport oxygen.

Hb Hb - Genotype of diseased person.

Hbs Hb - Genotype of Carrier person.

3. Pheny kketonyria oz moz

It is due to the absence of enzyme phenyl alanine bydro ocylase this converts phenyl alanine to pa The Tyrosine. So the phenyl alanine will be accumulated in body and converted into phenyl pyryvic acid. H will & be deposited in brain causing braine gamage and keton bodies gre eliminated through yrin.

sterile males with female

## chromosomal disorders.

1. Down's syndrome.

It is due to 21th trisomy. They have 3 21th chromo-some. So they have 47 chromosomes with 45 Auto somes and & sexchromoso mes. It is known as Mon-Holism. They have mental so retardation and congena-19 beart diseases.

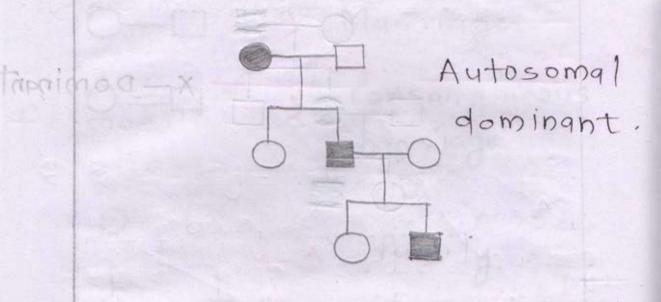
p. Klinefelters Syndrome

They bave 44 Autosomes + XXY. So they have 47 chromosomes. So they are sterile males with female

characters (Gynaecomastia). 3 Turners syndrome They have 44 Autosomes + xo. They are sterile females Pedegree analysis It is a chart to repre sent inheritance of a chara cter or disease in hyman ev family Female -) male > Sex un specified - Diseased

Marriage Consangineous 10 ar count -Recessive Male -> Sex un specifica DISEASE

Autosoma X-Dominant tapalanop STAL BASS topla letrecor CJEORS A P leag -wolls O somal strays babarage STATE OF LANGER OF THE Plants on Trocop An: Parents Wollow Calue Cu Autosomal Recessive BHHAL (वार्ष्या Gametes F generation



Q A cross blw Pyre tall plant with green pod and dwarf
Pea plant with yellow pod will produce howmany shorts
Plants in For

An: Parents tall x dwarf yellow

Recessive

TTGG HIGG

chametes (TG) (tg)

Figeneration. Ttag green

softing IX Ttag Fi parent TG(Tg) (+G) (+g) x TG(Tg) (G) (G) Glametes colour is recesive @ Blue eye own for TGblo sTg autodo of tg TTGG TTGG TtGG TEGIG TG Tall Tall Green Green Tall Tall Green Green green Tt Gig TTGIG Ttgg TT89 Tg Tall Gireen Tall Tall Yellow Yellow Gireen THAG TtGG ttag ttag Tall green t9 T911 dwarf dwarf Green green green Ttag Ttgg ttag ttgg dwarf green tg Tall Tall gawarif yellow. Yellow Green ration - 9:3:3:1 Phenoty pic ratio - 1:2:1:2:4:2:1:2:1 Geno typic

H will produce 4 short Plants in F2 in 23 sompla P Blue eye colour is recesive to brown eye colour. A brown eyed man whose mother was blue eyed marries a blue eyed woman. Their children will be TO TOP yelled dereco yellow An: Brown - B BOTT Ttorcy topa blue pow b TO TAIL mother - bb. Green man — Bb Woman — bb. Ttag Le Tall GIREEN Phenoty pic nation - 9:3:3:1 Genotypic natio - 1:2:1:2:4:2:1:2:1

Parent gametes Figeneration. Bb bb blye Brown will be Brown Their children or blue A man of blood group A marrie a woman of blood group AB which type of their progeny indicates man is heterozygus.

Heterro X DA. IB TAi Parent agmetes. Figene ration. Homo Widte Gamete OPO4 AB

progeny indicate man is heterosygous

A haemophilic man marries a woman carrier for haemo philia what would be the possibility to their daughter to be haemophilic.

agametes och y a chy

The chance daughter should be been philic is \$50/.

e A brown eyed couple has a blue eyed child find out the genotype of the CA bacmaphilic man. 29800 ics An: Parents. BB Bb. philia what would gametes. B 6 . siling (BB) Marroll ida mother man: BBor Bb female: BB or Bb The genotype is Bb and daughter shortd be the chance . 100% 21 ogemo philic

Bb Parents 1 gametes Figene BB Bb Bb bb ration of couple is . . The genotype Bb man Woman P.A husband and wife normal vision but fathers of both of them their colour bling. tind out the posibility of their first daughter to be cology blind, nottom seed to abduce pate aba paig the contain

father - only x y father - xy xy bysband - xy SHOPPI mother de xxx walt by Parents o x y ons ( xx @ 9 9 gameta xx ocot xy xy The Possibility of their first daughter to be colourblind is

Q A person whose father is colour blind marries a lady whose mother is daughter of colourbind man and woman.

Their children will be? father - x y X X ga met Son grand father - xcy grand mother acy wo Parents gametes (2) ladies mother (b)80 lady no of gametes = n = heterogametic construen

Parents on Son rlady XXC xy DC DC @ (9 gametes xx x x y x xy xy grand father Boy, of their son, paper & find out the gametes produced by an individual of genotype AaBBccpd Parent: - AgBB cc. Dd gametes (ABCD) (ABCd) (aBCD) no of gametes = 25 n = heterogametic condition

Q A colour bling mass a colour eblind sister and a normal brother. Find out the genotype of father and mother An: man - xy Sister \_ x x c \_ 7 redt pt. normal man \_ xy . a sonotu Parents and proxigi (2) (y) (y) xxe xy xx xy i. the genotype of father is go x g and mother is xx Their son best of the med T The Board of the Pres Pres Year

Q A woman's father has A haemophilia byt ber hus squiband does not what is the change of their son to has the disease. Ah. father - schy 7 mx 200 Woman yxxx bom lon ron Parents husband - ay Parent oc xb xy (2) (2) (2) (2) (3) redtof for forther are ei rantomay max hoxby Their son has to be disease 50%

More Cor Chance 19 1000 MHERITANCE Abra to syricity ( DIA 10 formed of nitro Seu pases benjose sabas and phosphote. Nitrogen bases are of xtwo types . Parines and pycomitines. Parines are adenine and Glygnine . Pyrimidines are Stosine. Ingmine and uracil. when a nitrogen base is joined with a pentose sugar sund ti pand sipisospip ba