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1. and has 14 autosomes one X and one Y-
2. chromosome. The zygote develops into sporophyte. The sporophyte mother cell undergoes meiosis
3. to produce haploid spores. Each spore has 14
4. autosomes and one X or one Y-chromosome.
5. The spore carrying a Y-chromosome develops into a male and spore carrying 'X'-chromosome develops into female gametophyte. The nature of developing gametophyte depends on the type of sex chromosome that it receives.

Sex determination in Maize:—

Maize is monoecious. Male and female flowers develop on the same plant. The ear (female flower) develops along the side stalk and tassel (male flower) at the top of plant. The two genes Bs and Ts control the normal appearance of female & male flower. The homozygous recessive genotype bbs result in maize plant which is ~~not~~ male i.e. it does not develop female flower. The homozygous recessive genotype bbs produces female flowers in lateral and terminal position without male flower. The genotype and phenotype in maize are given below:—

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Genotype

Phenotype

$\left[\begin{matrix} B_1 & - & T_1 \\ F & & M \end{matrix} \right]$

- normal (monocarpic)

$b_1 b_1$

- female are terminal only

$t_1 t_1$

- Male

$T_1 - b_1 b_1$

- female can be terminal and lateral

It is clear that homozygous recessive $b_1 b_1$ gametophyte trait forms ~~the~~ the male flowers into female. The female flowers develop in this genotype where as the male flowers develop in this genotype where as the male flower should have influence dominant gene T_1 . The homozygous recessive $t_1 t_1$ hinders the development of female flower only in lateral position. In presence of genotype $b_1 b_1$ the terminal female flowers in place of male flowers is not affected. variation in two genes converts a monoecious plant into a dioecious plant.

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Sex determination in Asparagus:-

Asparagus is a dioecious plant. But female flowers bear rudimentary anther and male flower bear rudimentary pistil. The rare male flowers having poorly developed pistil may set seeds. When seeds obtained from a rare male flowers bearing were sown into plant. The male and female plants were found in 3:1 ratio when male plant raised were used to pollinate female flower on female plant only $\frac{2}{3}$ of them showed ~~anther~~ segregation indicating that sex is controlled by a single gene. In this case maleness should be dominant over femaleness. This can be shown by the diagram given below:-

Rare Male plant-

(Pp)



Selfed

PP

Pp

Pp

pp

Homozygous

25% (male)

Heterozygous

50% (male)

25% female Homozygous

25%

75%

3:1

CamScanner

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Fig - Segregation for Sex in seed obtained from a male bisexual flower in *Asparagus* showing Monogenic control.

Environmental control of Sex: -

Plants offer many more example for environmental influence in sex. If ~~Soil~~ Soil condition favour good growth *Equisetum* will show female character. On poor soil, plant show male character.

Plants of *canabis sativa* (Hemp) with XY-Mechanism normally produce only male flower. If seeds are sown in summer months (May-July) both phenotype male and female plants are produced in 1:1 ratio. If seeds sowing is delayed beyond July, the proportion of female plants increases. If seeds are sown in winter when day are short and night-long female plants are produced. In (*Musk Melon*) (*Cucumis melo*) and *Cucumis sativus* sex expression is regulated by ethylene proposed by Bryas et al.

Sex-determination in Prokaryotes

The sex-determination in micro-organism depends upon the cytoplasmic factor or F-factor. It was discovered by Hayes during conjugation in E. coli. If the strain contains F-factor or sex-factor acts as male or donor strain. If F-factor or sex-factor is absent in strain called female or recipient.

CONCLUSION

From the above discussion we may conclude that not any one character is responsible for the determination of sex in plant. In some plant the sex can be determined with the help of 'XY' Chromosome, on the basis of number of autosomes and sex-chromosomes. Single gene determines the sex and also the environmental condition is responsible for sex determination.