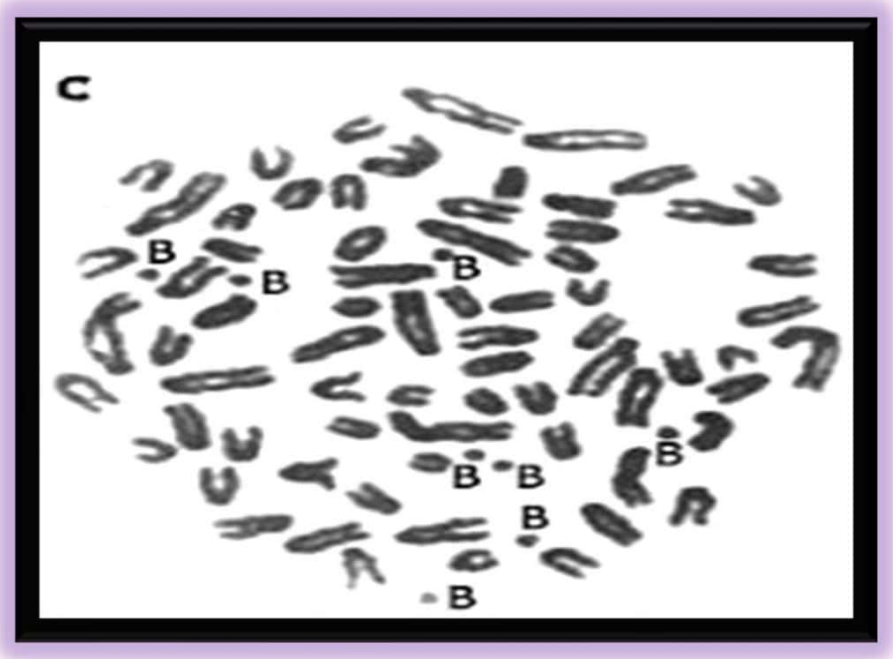
COURSE: M.Sc. Botany PART-I PAPER – VII

TOPIC : B-chromosomes (CELL BIOLOGY)

Prepared by : Dr. Rashmi Komal

Coordinated by Prof. (Dr.) Shyam Nandan Prasad



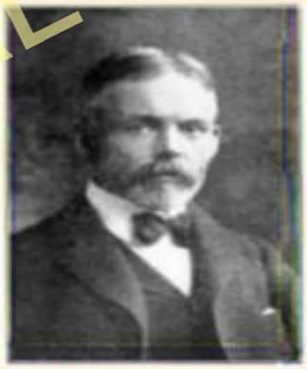
B-CHROMOSOME

What are B-chromosomes ?

- Chromosomes which are found in addition to normal chromosome complement of a species and are not essential for normal growth and development.
- Also known as extra, supernumerary, and accessory chromosome.
- B - chromosomes were first discovered by E. B. Wilson in the leaf-footed plant bug insect Metapodius (now called Acanthocephal) a century ago and many of their distinctive features were described at that time.
- The term 'B-chromosome' was first used by Randalph (1928).
- This chromosome is similar to the normal somatic chromosome in their morphology.

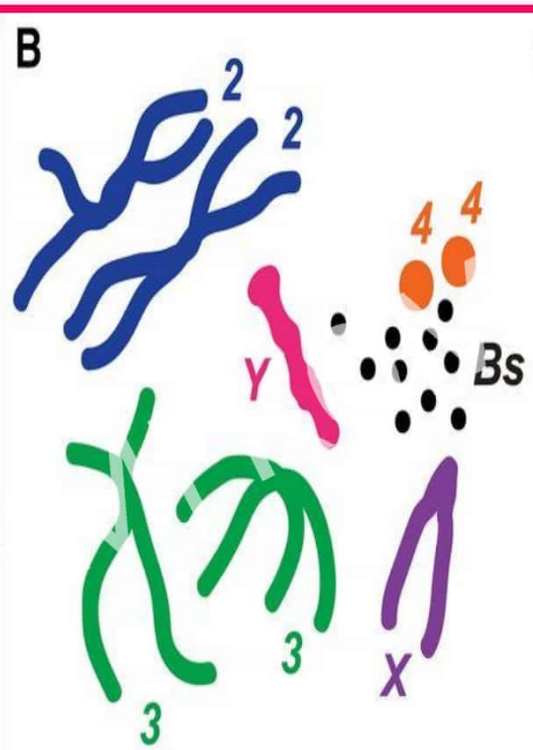
History Of B-chromosomes

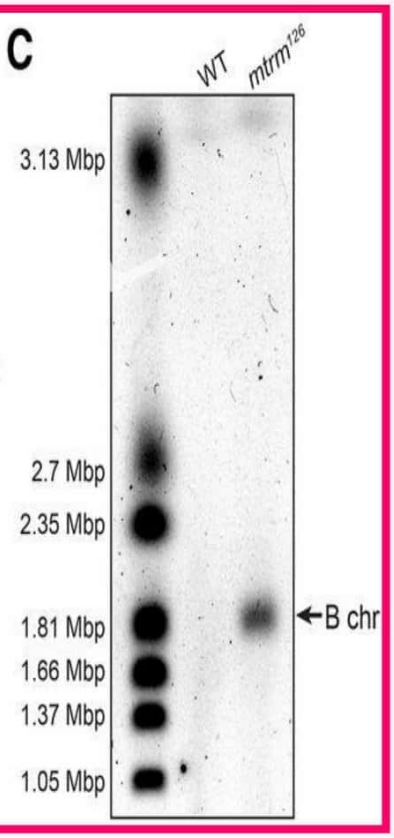
- **E. B. Wilson(1907):** First discovered in leaf footed plant bug i.e. *Metapodius.*
- **1920:** It come to notice in *rye.*
- **Gotoh(1924):** Clearly define supernumerary nature.
- **Kuwada(1925):** Reported in Maize.
- **Randolph(1927):**Classified them as a B chromosome.



E. B. Wilson

Metapodius





Structure of B-chromosome

GENERAL PROPERTIES

- They differ morphologically from A chromosome.
- In wild populations around 100 animal species, 600 plant species (especially fungi) contain B - chromosome.
- Leads to some reduction in vinegar and fertility in maize.
- B - chromosome are largely heterochromatic.
- Carry no genes with major effects.
- 90% of these B - chromosomes tend to lack centromere. They are to move towards either of centrioles and poles during cell division.
- Smaller in size and carry less DNA than a chromosome.
- Non-mendelian inheritance, that is, not pairing and random distribution during cell division

Effects of B-chromosome on plants

- Both favourable and unfavourable to plants
- Slight and difficult to detect
- Controls chromosome pairing in hybrid

S.NO.	CHARACTERS	EFFECT	SPECIES
1.	Germination	Delayed Speed up	*Secale cereale* *Allium porrum*
2.	Growth & vigour	Reduced	*Aegilops speltoides* *Zea Mays* *Secale cereale*
3.	Flowering time	Delayed	*Secale cereale* *Zea Mays* *Allium spp.*
4.	Fertility	Reduced	*Aegilops speltoides* *Zea mays* *Secale cereale*
5.	Seed weight	Increased	*Secale cereale*

CONCLUSION

- B chromosome are not essential for normal growth and development of plants, however their effect on phenotype are manifold, often pronounced and startling.
- They affect cell size, duration of cell division, protein and RNA contents of cell, distribution of chaismata and chromosome pairing in species in meiosis.
- Many effects of B-chromosome are deleterious to fitness but their effect on crossing over at meiosis could have adaptive significance on generating novel and superior genotype.