SUMMARY AND CONCLUSION

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Passiflora a polytypic genus belonging to the family passifloraceae is a large genus costisting of 400 species. Passiflora incarnata L (2n = 18) which is classified under sub genus Granadilla is highly self and cross incompatible. P. incarnata has a medicinal value and used in the treatment of Insomnia and psychoneurosis.

A survey of the previous Literature shows that very little cytogenatic work has been done in the genus passiflora. Majority of work deals with chromosome numbers, pollination ecology, acclimatization, pest and disease control and agronomy. It was, therefore, thought advisable to under-take cytogenetic studies in the genus Passiflora with special reference to P. incarnata.

Mitosis was found to be normal in p. incarnata. Detailed karyotypic analysis have been done. Karyotypic analysis shows that P. incarnata possesses 5 types of chromosomes and karyotype is symmetrical. The position of centromere varies from median to submedian. Only, one pair of Sat; chromosome was observed.

Chromosome banding has been done in P. incarnata. Orcein banding revealed a characteristic banding pattern which allowed the identification of 8 pairs of chromosomes in p. incarnata. The position of dark staining (O-bands) are present

either in centromeric, telomeric or intercalary position. Percentage of total O-banded chromosome length was 27.0895. Non homology in chromosome pair number VI indicates that the P. incarnata has had hybrid origin. The recent Trypsinorcein-banding technique allowed the identification of 6 pairs of chromosomes in P. incarnata. It has a characteristic distinct single Trypsinorcein band at the centromerer in chromosome pairs VII, VIII and IX. The percentage of total Trypsin-orcein banded chromosome length was 25.5754. Giemsa, banding technique have been of limited use because of the difficulty of air drying of solid tissue and other practical difficulties. In P. incarnata the Giemsa banding percentage determined was 50.1864. Further research is required to design a method which can be effeciently applied to the chromosomes like that of P. incarnata. The present study indicates that the banding pattern of chromosomes obtained after Giemsa staining technique is less reproducible than Try psin-orcein banding. The specific banding pattern produced by banding techniques are of immense value - in identifying the individual chromosomes length, the detection of structural changes in reconstructed karyotypes and studies in chromosome polymorphism in plant populations.

It was observed that in P. incarnata meiosis was highly irregular and abnormalities which were found in PMCs include percocious movements of bivalents and occasional occurrence of univalents. The irregular meiosis is characterized by the presence of bridges, laggards, univalents, bivalents, micronuc

formations,and cytomixis. Abnormality percentage determined was 76.3 %. Fruit setting failure is due to this high abnormality percentage in P. incarnata. present study also shows that the coefficient of chiasmata terminalization is more at metaphase-I, indicating complete terminalization of chiasmata at metaphase I. From the meiotic studies it can be concluded that extensive hybridization and structural alterations of chromosomes have played an important roles in the evolution of P. incarnata.

Pollen grains of P. incarnata were studied. Time of anthesis and receptivity of stigma in P. incarnata determined were 9.00 a.m. and 11.30 a.m. respectively. Three different types of stylar positions are present in P. incarnata. Very poor percentage of pollen grain germination has been observed in all the 3 types of P. incarnata. This is correlated with meiotic abnormalities and thus results into abnormal pollen grain formation. The present investigation shows that P. incarnata never yielded fruits either in selfing or in intertype crossing experiments. The sterility of pollens, its abnormal germination in vivo and in vitro, presence of cutinase in pollens, inactivity of enzyme situated within the pollen due to early dehydration of pollen on the stigma, chromosomal abberations, type of cytomixis during meiosis and heterostyly, rule-out the possibility of fertility and strongly confirm the incompatibility condition in P. incarnata.

Effect of colchicine and chemical mutagens, Diethyl sulphate and N- Methyl - N'- Nitro - N - nitrosoguanidine on P. incarnata have been studied. The tetraphoid is dwarf as compaired to control possessing thicker, stouter stems and was more vigorous. They have larger and thicker roots. Number of branches and leaves on the tetraploid were reduced as compared to control; but size and shape of leaves in tetraploids were more than diploids. The tetraploid leaves are thick, large and dark green. The tetraploid leaves showed distortions, irregular margins, narrowing of leaves, assymetrical blade development, strong venation, contrast in colour and short thick petiole. The tetraploids were found to bloom late by atleast 3 days compaired to control. In the tetraploids size of guard cells were greater than those of diploids, but the number of stomata/unit area decreased considerably in tetraploids. In case of DES and MNNG treated plants it was observed that the mutants were dwarf as compared to control. As the duration of MNNG treatment was increased the size of the leaves decreased considerably, but for DEs treatment the mutant showed variation in respect of size and shape of the leaves. The mutant showed changed leaf shape from oblong to trifid. Number of buds on the mutants were decreased as compared to the control for both DEs and MNNG treatment, but flower buds could not be traced for MNNG treatment beyond 48 hours. In the present investigation mutants showed delayed emergence of bud. The mutants were found to bloom late by 3 days for DEs treatment and 2 days for MNNG

treatment as compared to control. After the maturation of the flowers the abscission takes place early in DEs treatment than MNNG. The colour of the flowers were found to be deep blue for MNNG treated mutants as against faint blue for DEs treated mutants as compared to control. There were not so much difference of the size of floral organs studied for both the treatments as compared to control. Number of stomata per unit area decreased proportionally as the DEs concentration was increased and duration of MNNG treatment was increased. The size of the stomates was increased in both DEs and MNNG treated mutants as compared to control. In general in present study it was found that the DEs treatment was more damaging than MNNG.