Cytological study of 87 species belonging to 40 different families comprising 102 collections has been carried out. Mitotic study is made in 14 species, and meiotic study in 65 species. In 8 species both mitotic and meiotic studies have been made. Present chromosome counts of these taxa and the earlier reports are recorded in Table-1. Of these, chromosome counts for 21 species are the fresh reports.

Morphological descriptions are given in detail for each species and the general observations are described under the relevant families which are arranged according to Bentham and Hooker (1862-1883) system. Recent names and synonyms have been given for many of the taxa as described by Razi (1953) and Raizada (1958, 1966).

Karyomorphological studies are made in 22 species. Out of these the karyotype analysis for 6 species is given for the first time. The above study reveals that many are mostly characterised by chromosomes with median and submedian constriction and rarely have subterminal primary constrictions and with secondary constrictions.
Satellites numbering from one to two pairs are characteristic features of the polyploid species like *Brassica juncea*, *Hibiscus trionum*, *Prasaria indica*, *Bidens bitemata* and *Curculigo orchioides*. The above study also reveals that naturally occurring species have more symmetrical karyotypes.

Diminution in the size of the chromosomes associated with polyploidy leads to the specialization of the karyotype. The karyotypic specialization leading to morphological variation is a step towards speciation. No such marked morphological variations are observed except for the difference in the size of the plant and floral parts, in species with different ploidy level and with karyotypic specialization. A gradual evolution from symmetry to asymmetry in the karyotype is noted in *Curculigo orchioides*. Reduction in the size of the chromatin length associated with specialization of the karyotype, has been found in the polyploid *Sphaeranthus indicus*.

Morphological observation of different collections of the same species and the meiotic counts in certain cases, reveal that there is difference in the taxonomic
feature correlated with increase or decrease in the ploidy level, as found in *Oleome viscosa* but no such marked variation is seen in *Centrantherum anthelmenticum* and *Ottelia alismoides*. Variation in the morphological features of the plants from different areas like the size of the leaves and floral parts as in *Erythrina variegata* L. (Coll.No. 252 and Coll.No. 548), colour of the leaves and size of the inflorescence in *Spilanthes paniculata* (Coll.No. 629 and Coll.No. 210) have been found with homogeneity in chromosome number and behaviour during division.

Meiosis in most of the species is normal. However, abnormalities like non-congression, precocious movement of the chromosomes, laggards, stickyness, unequal distribution, micronuclei, non-synchronization, 3-5 nuclei formation and cytomixis are observed in most of the taxa. However, the percentage of such abnormalities is less not to disturb the normal fertility and seed setting.

Univalents and multivalents are found in most of the polyploid taxa. High frequency of multivalents is found in *Phaseolus radiatus* L. (n=11) and *Bauhinia racemosa* (n=14) which may be considered to have evolved through
introgression while most of the naturally occurring species are segmental allopolyploids.

Cytological study relating to the classification of the genera, have been elucidated in a few cases. *Gleoma icosandra* and *Capparis sepiaria* resemble cytologically in having chromosome numbers in multiples of 10, more or less of same size and behaviour of chromosomes though they differ in the taxonomic features. It is not justified in this respect to keep them under separate families as done by Hoffmann (Willis 1966).

Among the 4 members of the tribe Helianthoideae of Compositae, *Xanthium strumarium*, *Spilanthes paniculata* *Eclipta prostrata* and *Bidens bitemnata*. *Eclipta prostrata* is characterised by long and medium sized chromosomes whereas the other three are with medium and short sized ones. The chromosome numbers of the 4 members show diversity in the characters as do most of their morphological features. The four members are rightly kept under separate subtribes. Cytological characters support the separation of *Eclipta* from the tribe.
The 5 genera of Gentianaceae, \textit{Canscora}, \textit{Centaurium}, \textit{Enicostemma}, \textit{Exacum} and \textit{Nymphoides} have been classified under 2 separate subfamilies taking endosperm characters into consideration by Srinivasan (1941). Separation of \textit{Nymphoides} under a different family is justified by the cytological data in the present investigation.

Cytological observation of \textit{Curculigo orchoides} and \textit{Sansevieria Roxburghiana} reveal diversity of taxonomic and cytological features, which confirm the separation of \textit{Curculigo} and \textit{Sansevieria} under separate families as done by Hutchinson (1959).

The importance of cytological study in the classification is elucidated in a few cases where related genera under the same family are studied.

Less percentage of meiotic abnormalities, less specialization of the taxa of different ecological environments and presence of diploids and segmental polyploid nature of the naturally occurring species reveal a slow and prolonging process of evolution and speciation.