VI. Summary
A detailed histomorphogenic studies of the fruit walls of the following genera are carried out: Carissa carandas L., Ervatamia divaricata L., Nerium indicum Mill., Plumeria rubra L. and Rauvolfia tetraphylla L. Besides these fruits, the architecture of the fruits of Aganosoma caryophyllata L., Allamanda cathart L., Alstonia scholaris R. Br., Catharanthus pusillus (Murr.) G. Don, C. roseus (L.) G. Don, Holarrhena antidysenterica (L.) Wall., Ichnocarpus frutescens L., Parsonsia spiralis Wall. Cat., Strophanthus wallichii A. DC., Thevetia peruviana (Pers.), Vallaris solanacea (Roth) O. Ktze., Vinca major L., Wrightia tinctoria (Roxb.) R. Br. and W. tomentosa Roem. & Schult. are studied under light and scanning electron microscopy.

Ovary is bicarpellary, subapocarpous with ovules on marginal placenta in Nerium, Plumeria and Ervatamia, while in Rauvolfia and Carissa the ovary is syncarpous and few ovules are borne on axile placenta. Among the three subapocarpous genera, Nerium shows clear postgenital carpel fusion and is persisting for a long time. Lower half of the ovary of Rauvolfia shows incomplete fusion of the carpels, while in Carissa, the upper half of the gynoecium is showing incomplete fusion of carpels.
Ovary wall is parenchymatous, differentiated into outer epidermis, mesodermis and inner epidermis. Outer epidermis is nearly homogenous, interrupted by stomata in Carissa and Ervatamia. Ovary wall is hairy in Nerium. Mesodermis embed the vascular tissue, laticifers and tannin cells. Mesodermis is differentiated into outer and inner zones in Plumeria and Carissa. Druse crystals are found in Ervatamia and Carissa. Laticifers are of non-articulated type and usually found adjacent to the vasculature. Innermost zone of the ovary wall is the inner epidermis which is single layered. Inner epidermis is more than one layered in Nerium, Plumeria and Ervatamia. Stomata and trichomes are totally absent on the inner epidermis. The inner epidermal cells of Plumeria possess tannin contents.

Septum is 12-15 layered thick in Rauvolfia and is 10-12 layered thick in Carissa. Tanniniferous contents and vascular tissue are present in the septal region. Placenta is marginal in Nerium, Plumeria and Ervatamia, but in Rauvolfia and Carissa ovules are borne on axile placenta. Ovules receive the vascular supply from the placental bundles. Tanniniferous cells are present in the placental tissue of Nerium, Plumeria and Carissa.

Initiation of fruit development takes place after anthesis. The fruit of Carissa is a berry; in Allamanda it is a capsule; in Rauvolfia and Thevetia it is a drupe;
and in rest of the members studied the fruits are follicular. Follicular fruits of Nerium, Parsonsia and Wrightia (W. tomentosa) are paired and fused. Calyx is persistent at the base of the fruit with collers inside. Each collet is a finger-shaped structure, differentiated into a long head on short stalk. Head portion consists of a central core of parenchyma cells surrounded by radially elongated epithelial cells.

Outermost zone of the fruit wall is the epicarp, which develops from the outer epidermis of the ovary wall. Epicarp is single layered in Rauvolfia, Thevetia, Aganosoma, Catharanthus sp. and Vinca. But in other genera the epicarp becomes multilayered, due to the additional development of a few layered collenchymatous zone with the outermost layer. In Allamanda the hypodermis is sclerenchymatous. Epicarpic cells are interrupted by stomata, ventilating pores, lenticels, spines and hairs. Stomata are of anomocytic or paracytic type. Ventilating pores are present in Ervatamia and Rauvolfia. In Plumeria and Wrightia sp. numerous lenticels are present, but stomata are totally absent in these fruits. Stomata and lenticels are present in Parsonsia. Hairs are unicellular in Nerium, Catharanthus, Vinca and Rauvolfia. Multicellular hairs are present in Aganosoma and Ichnocarpus. Capsular fruit of Allamanda possess numerous stiff spines.
Mesocarp is 4-6 layered thick in Catharanthus and 300-400 layered thick in Strophanthus and Thevetia. Mesocarp is differentiated into outer and inner zones in Plumeria, Vallaris and Wrightia sp. on the basis of its cell shapes. Mesocarp possesses grouped sclerieds in Strophanthus, Vallaris and Parsonsia. Vascular bundles, laticifers, tannin cells and mucilage cells are embedded in the mesocarpic tissue. Vascular bundles are conjoint, collateral or bicollateral, but with a zone of cambium in Nerium only. Towards the maturity of the fruit lumen of xylem elements are highly reduced in Nerium and Aganosoma. A group of parenchyma cells above the bundle becomes lignified to form a bundle cap. Laticifers are of non-articulated branched type. Latex is milky-white or colourless. Tanniniferous cells are present in the mesocarp. Mucilage cells are present among mesocarpic tissue of Ervatamia.

Endocarp is parenchymatous in Carissa and Ervatamia. Thickness of the endocarpic zone varies from 1-2 layers to 30-50 layers of cells. In Carissa inner tangential walls of the endocarpic cells are thickened. Sclereified endocarp of Wrightia, Plumeria and Vallaris are heterogenous in nature; of which the innermost zone is thickened heavily. Outer endocarp of Plumeria and Vallaris possesses laticifers which are surrounded by sclereified cells. Endocarpic cells possess crystals in Nerium and are rectangular or druse
Endocarp is stomatic, but unicellular hairs are present in Ervatamia.

Septum is parenchymatous and vascularized in Carissa. Septum is 24-26 layered thick in Carissa. In all the follicles the ovules are borne on marginal placenta. In Carissa and Rauvolfia few sessile ovules are axillary attached to the placenta. Ovules are found on parietal placenta in Allamanda. Seeds receive the vascular supply from the placental bundles. Seeds are comose. But the seeds of Catharanthus, Carissa, Allamanda and Vinca are devoid of coma. Seeds of Ervatamia are arillate.

Dehiscence of the follicle is through the ventral suture. A pair of follicles is developed from a single flower and the fruits are fused with each other by their ventral sides in Nerium, Parsonsia and Wrightia (W. tomentosa). In those species where the follicles are fused, a separation of the two fruits is a must phenomenon before dehiscence. Separation of the follicles initiate from tip and proceeds basipetally. Dehiscence of the fruit initiates from placental side towards periphery. In Vinca some of the cells adjacent to the dehiscing zone become sclerified. In Allamanda the dehiscence of the fruit is septicidal.
Histochemical tests for starch, protein and lipid are carried out. Starch grains are present in the ovary wall and in developing and mature fruits. Protein is present sparingly. Lipid globules are also localized in the ovary wall and fruit wall tissues.

Elemental constitution of the mesocarpic cells is revealed by Energy Dispersive Analysis of X-rays (EDAX).

Taxonomic and phytogenetic significance of fruits are also discussed.

Ultrastructure:

A sequential subcellular study of the developing pericarp of *Nerium indicum* has been performed. Outermost zone of the ovary wall is the outer epidermis. Its cells are radially elongated and covered externally with a thin smooth cuticle. Cytoplasm possesses most of the cell organelles like mitochondria, golgi, vacuoles, ER, ribosomes and plastids. Golgi bodies are producing numerous vesicles, which are moving towards the newly formed wall. Mesodermal cells are spherical or oval in outline. Plasmalemma of the mesoderm cells shows invagenations with or without vesicles inside and number of plastids is more than that in the outer epidermis. Both outer epidermis and mesodermis possess lipid globules.
Outermost zone of the fruit wall is the epicarp, which is constituted of radially elongated cells, covered externally with thick cuticle. Microfibrils of the cell wall are distinct. In the developing fruit, cell organelles are found with its maximum intensity. Cells possess central large vacuoles. Plastids possess starch grains and plastoglobuli. Beneath the epicarp is the mesocarp, constituted of loosely arranged spherical or oval cells. Its cells possess one or more large vacuoles. Lipid globules are present in the epicarpic and mesocarpic cells.

In mature fruit, the epicarp becomes multilayered due to the additional development of few collenchymatous cells close to the outermost layer. Outermost layer is covered with a thick cuticle, showing the microfibrils. A thin layer of cytoplasm present around the vacuole possesses cell organelles. Number of cell organelles are considerably reduced. Golgi is not observed. Plastids possess one or more electron opaque starch grains. Mesocarpic cells are also highly vacuolated.