The family Polygalaceae also known as “milk-wort” family has a dispersed distribution. The majority of the taxa occur in moist tropical habitat, while some have established well even in the arctic zones. Floristic studies reveal the presence of twelve genera; however in South India the family is represented only by four genera. The members are characterised by flowers with Papilionaceous corolla, coronary appendages, multicolpate pollen grains, hairy carunculate seeds and a characteristic odour for the roots. The colour of the corolla ranges from purple and faint orange to yellow.

These general characters easily enable the botanists to classify the plants in Polygalaceae and to consider the family as a distinct and extremely natural group. In addition to the vegetative and floral characters, the present day taxonomists look for evidences from other branches too. Although Bentham and Hooker’s classification of the family has been accepted as a comprehensive system, some modifications to this group especially regarding the phylogenetic relationships of the genus *Xanthophyllum*, Roxb. have been proposed by recent taxonomists. Previous studies pertaining to the systematics of Polygalaceae include foliar features, leaf, stem and root anatomy, autecology, physiology and seed morphology based on light microscopic studies. The present work has an added significance to highlight the stomatal features, foliar histochemistry, palynology, seed morphology and embryology of the available plants in South India.
The plants for the present study were collected from selected regions of Kerala, Tamil Nadu, Karnataka and Maharashtra. They include trees, shrubs and herbs, and many of these plants were grown in the botanical garden of St.Teresa's College, Ernakulam for flowering and identification. Seeds and pollen of some species were procured from herbaria for morphological studies. The observations and the results of the investigation are presented in four sections as given below:

1. FOLIAR MICROMORPHOLOGY AND HISTOCHEMISTRY

This section deals with foliar epidermal characters such as nature of stomata, stomatal index, stomatal frequency, palisade ratio and epidermal histochemistry.

2. POLLEN MORPHOLOGY

This section includes the surface micromorphology of pollen grains with special mention on the significance of pollen studies in systematic classification.

3. SEED MORPHOLOGY

This section comprises micro- and macromorphological features of seeds. The taxonomic and phylogenetic significance of seed morphology has been highlighted.

4. EMBRYOLOGICAL STUDIES

This section is restricted to studies regarding the development of anther, microsporogenesis, structure of pollen grains,
ovule ontogeny, megasporogenesis, seed development and seed structure of a few taxa, highlighting the significance of embryology in taxonomy and phylogeny.

The collection of specimens, their identification, collection of back references, the standardization and interpretation of pollen acetolysis, histochemical reactions and scanning electron microscopic works, were successfully carried out with the help of the wholehearted co-operation from the research guide, eminent scientists and my colleagues. Their valuable and timely guidance entailed successful completion of this work in stipulated time and their services have been acknowledged in the following pages.