1. INTRODUCTION

The last three decades have been the most exciting period in the history of reproductive physiology. Integrated studies using diverse techniques particularly of advanced microscopy, cell and molecular biology and genetics have revolutionized our knowledge of the structural and functional aspects of reproductive organs, leading to the development of aspects of a ‘new reproductive biology’. Instead of remaining a purely morphological branch of science, reproductive biology nowadays has transformed into morphophysiological and ecomorphological science. This remarkable progress on reproductive biology has resulted in the development of a number of effective and viable technologies for practical benefit, especially for crop improvement.

One of the objectives of reproductive biology is to elaborate the theoretical foundations of sexual reproduction. Reproductive biology deals with studies of various interrelated stages of ontogenesis of reproductive organs. Such studies are important for the introduction and repatriation of rare and endangered plants, as well as plants of commercial importance. Reproductive biology is now becoming increasingly important for various physiological and biochemical studies also.

The most fundamental question in developmental biology is how an organized multicellular organism develops from its single cell origin. It seems that coordinated involvement of different tissues is a fundamental requirement for this organization. It means that the development of a multicellular organism requires differentiation of several tissues, each with specific structure and function, and each is aware of others to modify the overall effect. This reflects the plasticity of plant development, which requires cross-talk between different tissues.

During the new era of reproductive biology the techniques of histochemistry, autoradiography, electron microscopy, fluorescence microscopy and several other modern techniques have been effectively employed to understand the fine structure and functional aspects of various structures associated with the development of pollen, embryo sac, endosperm and embryo. In this context, modern technologies have provided new insights into the role of tapetum in pollen development, morphogenesis of pollen wall, role of synergids in fertilization, mechanism of double fertilization and role of suspensor in embryo development.

Histochemistry is a technique useful to understand both structure and functional aspects of various tissues in a heterogenous organ. Histochemistry enables identification and localization of specific substances within cells and tissues which are of great advantage in understanding the
physiological function of them. *In situ* localization of substances unravels the sites of their synthesis, storage, transport and metabolism of the tissue concerned. Histochemical tests characterize every stage of cell, tissue and organ during their differentiation by analyzing the involvement of specific metabolite(s) and enzyme(s).

The present histochemical study on the developing anthers of *Chlorophytum laxum* R.Br. Prodr. is taken up for several reasons. Although anther development has been studied in many Liliaceae members, information on *C. laxum* anther is lacking, histochemically in particular. Another primary objective of this study is to give coherent and concise account of anther development in general. Looking into vast articles published on the anther, but scattered to different journals devoted to particular aspect, collection of all these information in a single binding helps students, teachers and researchers. The information presented in the study provides an overview of recent developments covering wide spectrum of anther development.

2. **AIM AND SCOPE OF PRESENT WORK**

In the present investigation *in situ* localization of insoluble polysaccharides, cellulose, nucleic acids (DNA & RNA), ascorbic acid and total proteins have been chosen because of their established role in growth and development. This does not imply that other metabolites have no role to play in the growth of anther.

The findings of the present research work will definitely help an applied researcher or a biotechnologist to imitate the results in the development of new varieties of plants. This work may also help in the production of male sterile plants. These male sterile plants play a crucial role in the plant breeding programme.