

CHAPTER 2

PREVIOUS LITERATURE

As expected there has been an accumulation of considerable amount of information on the taxonomy and classification of the family Orchidaceae and naturally difference of opinions between the workers prevails. Reference to some of these important works has already been made in INTRODUCTION and the author prefers to refrain from more elaboration on the point as the primary objective of the present investigation is not under the perview of taxonomy and nomenclature.

Because of the complexity of external structures in many cases there has been some amount of confusion and diversity of opinion regarding the exact morphological nature and also terminology. This would be very clear from the statement made by Rosso (1966) which reads as "Although the information in certain of the above works is considerable, in many instances I have been unable to determine exactly which of the organs were being described, e.g., the terms 'inflorescence spike' and 'inflorescence stem' have been used in the same publication to describe the elongated peduncle in Paphiopedilum and Phragmipedium, respectively. Also, 'stem' and 'shoot' are often used without specifying the exact stem portion, the term 'stem' applying equally to the rhizome and to the foliage-bearing aerial portion of the plant." In order to avoid confusion he adopts three clear terms to denote the exact morphology of the axis - rhizome, leafy stem and inflorescence rachis or peduncle.

Of all the different tissue-zones in the root of orchids velamen has received the greatest attention from the anatomists. As early as 1888 Schimper noted the existence of epiphytic orchid without velamen and terrestrial one with velamen.

Groom (1933) and Hao (1953) studied the structure and function of velamen and have suggested their views on the subject. Engard (1944⁴), Muly et al. (1958) and Sanford and Adanlawo (1973) have examined velamen along with the exodermis and expressed their opinions.

Sanford and Adanlawo (1973) coined the term "epi-velamen" to distinguish the outermost layer of the multi-seriated velamen which differed much from the other layers. They have also stated that the presence of epi-velamen, number of velamen cell layers, and shape of epi-velamen and velamen cells are remarkably consistent within broad taxonomic groupings.

The anatomy of the root of several orchids have been analysed by botanists like Curtis (1917), Rosso (1966), Alconero (1962), Chen (1968-70), Mejstrik (1970), Gupta et al. (1970), Chiang S-H. Tsai (1970), Chiang S-H. Tsai and Chou Tan (1971) and Withner et al. (1974).

Ogura (1953) and Sasikumar (1975) investigated the morphology and anatomy of the subterranean tuberous roots, but neither

those materials belong to the tribe Epidendreae nor in the present investigation any such organ has been encountered.

Limited work has been carried out on the stem of orchids, particularly those belonging to the tribe Epidendreae. Curtis (1917) investigated the course of vascular bundles in the stem leading to the leaf-base in six epiphytic species of New Zealand orchids - including species of Bulbophyllum and Dendrobium. The anatomy of the stem of Dendrobium macrei Lindl. (Cesmotrichum fimbriatum Blume) has been briefly described by Gupta et al. (1970). The morphological as well as the anatomical structure of the stem have been discussed by Rosso (1966) and Withner et al. (1974).

Curtis (1917) has narrated the anatomy of the leaf of six epiphytic species without giving much emphasis to any particular structure. Gupta et al. (1970) have treated the leaf structure of Dendrobium macrei Lindl. very concisely.

The presence of "hypodermal storage tracheids" and trichomes in the leaf of Coelogyne flaccida Lindl. has been reported by Schindler and Toth (1950). The glandular trichomes, proposed to be secretory by Solereder and Meyer (1930) and others, have been evidenced recently to be absorbing trichomes by Pridgeon (1981).

Rosso (1966) has pointed out that in the sub-family Cypripedioideae the mesophyll tissue is thicker in plicate leaves

than in the conduplicate ones and the thickness of the latter is due to a prominent adaxial epidermis.

Ayensu and Williams (1972) have correlated foliar vegetative anatomy with floral characteristics to determine the relationships between certain orchids of the sub-tribe Oncidiinae.

According to Withner et al. (1974) an increase in the quantity of the extravascular fibres corresponds to the degree of toughness of the leaf.

To summarise briefly it may be stated that the anatomical investigations have been performed only in a limited number of species belonging to Epidendreae. These comprise the genera Liparis Richard; Dendrobium Swartz; Bulbophyllum Thouars; Eria Lindl.; Spathoglottis Blume; Phaius Lindl.; Coelogyne Lindl.; Calanthe Brown and Arundina Blume.

The available literature reporting the number of chromosomes in the members of Epidendreae has also been consulted, although no such cytological work has been conducted in the present investigation. Such cytological data has been used in the present study to correlate the suggestions proposed in consideration of the morphological and anatomical characters. The following references have been taken into account - Duncan (1959); Arora (1968, 1971); Belkhovskikh et al. (1969); Mehra and Vij (1970);

Gerald-K. Arp (1973); Susnik and Lovka (1973); Mehra and Sehgal (1974, 1975, 1978 and 1980); Tanaka and Kamemoto (1974); Malla et al. (1976); Vij et al. (1976); Mehra and Kashyap (1976, 1978 and 1981); Malla et al. (1978 and 1979); Biswas (1980); Vij et al. (1981) and Singh (1981).