

Introduction

The purpose of publishing an illustrated treatise on the genera of Orchidaceae in Hong Kong is threefold: (1) to report a portion of the work accomplished by the Flora of Hong Kong Project; (2) to fill the vacuum of complete lack of references for a fundamental knowledge about this fascinating family for the people in China and the adjacent regions; and (3) to contribute our first hand observation of living specimens of orchids growing in Hong Kong for the information of orchidologists who depend on herbarium material for comparative studies elsewhere.

Flora of Hong Kong Project: The history, program, and progress of the Flora of Hong Kong Project was published in 1972.¹ The needs, cooperation and support of the orchidophiles of Hong Kong were important factors which made it possible for this publication to become one² of the first fruits of the Project. Needs were engendered by the fact that amateurs in Hong Kong depend upon the assistance of a professional taxonomist who works on the flora of the area to identify their specimens, explain the morphological characteristics of the species, and even to appreciate their achievements. A friendly relationship was established with the amateurs of orchids during my sojourn in Hong Kong. Among them are members of the Hong Kong Native Orchid Group under the leadership of Mrs. Gloria Barretto, and Dr. Sandy T. C. Lee, President of the Hong Kong Orchid Society. Members of the first group are interested in the exploration of the wilderness of the area, transplanting the spontaneous species of orchids, photographing the flowers, identifying them, and promoting their conservation. Members of the Orchid Society are interested in the importation, cultivation, hybridization, and selection of cultivars of horticultural merits. They have supplied me with flowering specimens for observation and illustration. Some rare species have been observed in the private collections of Dr. Tso Hsüeh-yên, and in the orchid garden of Kadoorie Farm.

A Supply of Reference: The appreciation and the cultivation of orchids have an ancient history, and a significant role in Chinese culture.³ These had become

¹ Hu, S. Y. (1972) Floristic studies in Hong Kong. *Chung Chi Journ.* **11**:1-25. Maps 1-2, figures 1-3.

² Another manuscript, "Common and Useful Plants of Hong Kong," has been accepted for publication by The Chinese University of Hong Kong.

³ Hu, S. Y. 1971. Orchids in the life and culture of the Chinese people. *Chung Chi Journ.* **10**:1-26. Map 1, figures 1-2.

popular in the Sung dynasty, and reached a highly developed stage in that period and the subsequent generations.

However, orchidology as a science is relatively new in China. Pioneers in this field of study are still among us. Orchidology, like many other disciplines of botanical science, had its beginning in the West. Amateurs as well as professional botanists in the East do not have the early literature published in Europe and America. Some of these publications concern the genera and species growing in the East. This lack of fundamental reference for a correct understanding and identification of their orchids forms a deep gorge which keeps the orchidophiles of the East from crossing to modern orchidology. Consequently their interest is limited to the cultivation and the appreciation of the cultivars. The few living collections of native orchids are not properly identified.

The present work is prepared to fill this gap in the lack of essential references on orchids, and to meet the need for a guide to identify the species growing in Hong Kong. Based on observations made with living specimens, in chapter I explanations are given to the basic features of orchids with 75 diagrams arranged in Figures 1-4 and with examples of local species. These represent the fundamental structures of 64 genera in 28 subtribes, four tribes and two subfamilies of Orchidaceae.

In chapter II keys and descriptions are prepared with terminology used by orchidologists throughout the world. For helping beginners to understand these terms, a glossary with Chinese equivalents and examples of included genera is provided. Visual aids for understanding the structure of each genus are given in form of habit sketches and analytical drawings of organs observed with the aid of dissecting microscope under strong illumination. All of the illustrations, with the exception of Figure 57, are original work. All the species known to me are listed in this work, and keys to taxa in genera which have more than one species are available. Four color plates (Figures 71-74) show the flowers of 18 species.

The usefulness of this work is not limited to the people of Hong Kong, for 94 percent of the genera included are represented in the spontaneous flora of Taiwan, the Philippines, and thence southward to Indonesia, Malaysia, and the mainland of southeastern Asia. Another 30 percent of the genera have their ranges extending northward to the warm temperate region of the Yangtze River, and 8 percent occurring even farther north to the temperate regions of China. Many of these genera also occur in Japan. Twenty-two percent of the genera are introduced from tropical America, Asia, or Africa. They are known in Hong Kong in cultivation only. For this reason, the material in this book provides a fundamental knowledge about orchids to people interested in the cultivated forms as well as to those enthusiastic with native species.

Amateurs and professional botanists are not satisfied in merely knowing the names of orchids. They would like to know why and how the species are in the vegetation of the area. Such material is presented in chapter III, on the composition and phytogeographic significance of the Orchidaceae in Hong Kong.

Advancement of Knowledge of Eastern Asian Orchids: Most genera and species of eastern Asian orchids were established on the basis of dry herbarium specimens deposited in one or few herbaria. It is well known that a dry orchid flower pressed flat appears very different from a fresh one. This condition has prevented the botanists working with herbarium specimens from seeing and reporting the delicate floral parts of the species they described. Consequently the information about these genera or

species is limited to the insufficient material available to the orchidologists. The present work prepared from fresh flowering specimens gives a fully illustrated account of the delicate floral structure. In every case except *Odontoglossum* and *Ornithochilus* where no flowering material was available, the description was made with the aid of a microscope before the specimen was turned over to the Botanical Artist, Mrs. Teresa Fung Wong, who has worked for eight years under my supervision. Both the description and illustrations were checked again with fresh material before the manuscript was submitted for publication. In the last three decades there has been a great deal of nomenclatural changes in Orchidaceae. Specialists differ in their concept of generic limits and specific interpretations. From material presented in this work, monographers may find the information on the exact structure of the genera and species growing in Hong Kong very helpful in their comparative study of all the species of a genus, a subtribe or a tribe.

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Anoectochilus yungianus

I

The Basic Features of the Orchids in Hong Kong

The orchids constitute the third largest family of flowering plants in Hong Kong. Approximately 78% of the genera are spontaneous and the remaining ones are cultivated exotics. Basic features in morphological diversity and ecological adaptation are discussed under the headings of (1) habit and habitat, (2) root, (3) stem, (4) leaves, (5) inflorescence, (6) flowers, (7) fruit, and (8) seed and seedling.

HABIT AND HABITAT

All the orchids of Hong Kong are perennial herbs owing their existences to partial or complete symbiosis with some fungi. Adaptive features to the subtropical monsoon climate with annual alternation of hot humid and cool dry seasons and to the topographical diversity with the associated ecological conditions are obvious. One-third of the native species pass through the winter dry season in dormancy like the orchids of the temperate region. They disappear after flowering, fruiting, and the dispersal of the seed. *Bletilla*, *Cheirostylis*, *Cryptostylis*, *Disperis*, *Eulophia*, *Habenaria*, *Nervilia*, *Pachystoma*, *Pecteilis*, *Peristylus*, *Platanthera*, *Spathoglottis*, and *Zeuxine* are good examples. Species of these genera all have subterranean tubers, corms, or fleshy rhizomes.

1. *Terrestrial orchids*: According to their habitat the native species of orchids in Hong Kong are predominantly terrestrial. Seven-tenths of the genera have the roots in or penetrating the soil, and three-tenths of them are epiphytes with aerial roots. Approximately 71% of the terrestrial species are erect and 29% of them are creeping. There are two types of erect terrestrial orchids, namely the solitary type and the caespitose type. With the solitary type, plants occur scattered in the field, each with a single leafy or flowering-leafy shoot (Fig. 1A). Species of *Brachycorythis*, *Platanthera*, *Pecteilis*, *Peristylus*, *Habenaria*, and *Disperis* are good examples. Plants with this type of growth habit require an annual period of dormancy. At the resumption of physiological activities in the following growing season two phenomena are apparent. In *Disperis*, *Habenaria*, *Pecteilis*, *Peristylus*, and *Platanthera* the corm or tuber gives rise to a leafy flowering shoot. In *Nervilia*, *Eulophia*, *Pachystoma*, and *Spathoglottis* the fleshy rhizome produces a flowering shoot and a leafy shoot from two separated buds (Fig. 1B). The caespitose erect terrestrial orchids appear in tufts (Fig. 1C). Plants with this type of growth habit are evergreen. The new growth diverges from the base

of the leafy pseudobulb. *Acanthephippium*, *Calanthe*, and *Cymbidium* are good examples.

The creeping terrestrial orchids in Hong Kong have slender and rather fleshy rhizomes with elongated smooth internodes and few long roots at the nodes. The rhizome addition to this rhizome is contributed by an ascending leafy and flowering shoot developed from an axillary bud formed below the apex of the rhizome (Fig. 1D). At the end of the photosynthetic, flowering, and fruiting season, a strong subapical axillary bud develops into a short shoot with a rosette of leaves while the mother ascending shoot falls and becomes an additional part of the rhizome. In the following growing season the short shoot elongates into another ascending flowering shoot. *Anoectochilus*, *Goodyera*, *Hetaeria*, *Ludisia*, and *Vrydagzynea* all have this type of growth habit.

2. *Epiphytes*: Epiphytic orchids have aerial roots attached to the bark of trees, to the surface of wet rocks in shade along the streams, or to exposed boulders subjected to diurnal temperature changes, strong winds, and the xerophytic condition of barren rock. Almost one-half of the epiphytic orchids native to Hong Kong have creeping habit, one-third with trailing habit, and one-fifth with erect caespitose habit.

All the creeping epiphytic orchids of Hong Kong are pseudobulbous. Among them two types of creeping habit are apparent, namely the dichotomous type and the straight-line type. In the dichotomous pattern, two vegetative buds may develop from the base of a pseudobulb simultaneously or at different seasons. Consequently the creeping rhizomes appear branched dichotomously. This pattern is very evident in *Coelogyne* (Fig. 1E). In contrast, in the straight-line pattern only one vegetative bud or a mixed bud is produced annually from the base of a pseudobulb (Fig. 1F). In *Cirrhopetalum*, *Bulbophyllum*, and *Eria* this bud develops into a short shoot which becomes a rhizome terminated by a leafy pseudobulb. In *Pholidota* this bud develops into a flowering shoot at first and after anthesis it changes into a rhizome with a pseudobulb, and a fruiting cluster between two leaves. In *Bulbophyllum* and *Eria*, the species with straight-line creeping habit may occasionally give rise to dichotomous branching conditions. In other species of these genera such as *B. levinei* and *E. corneri* the internodes of the rhizomes are very short and the pseudobulbs appear crowded (Fig. 1G).

The trailing epiphytic orchids have elongated leafy stems which trail along supports propped and anchored by very long and often branched aerial roots. *Acampe*,

FIGURE 1. Habits and habitats of Hong Kong Orchids: A–D. Terrestrial Orchids. A. The solitary habit of *Platanthera mandarinorum* with a herbaceous deciduous stem terminated by an inflorescence, and a subterranean fleshy tuber. B. The rhizomatous habit of *Eulophia sinensis* showing two types of shoots, the flowering shoot developed earlier in the growing season, and the leafy shoot developed after anthesis. C. The caespitose habit of an evergreen orchid, *Cymbidium ensifolium*. D. The creeping habit of *Hetaeria nitida* showing the terminal inflorescence and the slender rhizome consisting of five years' growth, each developed from a subterminal bud. E–I. Epiphytic orchids. E. The dichotomous branching of the rhizome of a pseudobulbous species, *Coelogyne fimbriata*, showing a flowering shoot developed at the apex of a mature pseudobulb. F. The straight-line type of rhizome of *Pholidota cantonensis*, showing the pseudobulbs of three years' growth, and current year's flowering shoot, one of the internodes is capable of developing into a pseudobulb with one or two leaves after anthesis. G. The habit of *Eria corneri* showing the crowded pseudobulbs. H. A monopodial epiphytic species, *Diploprora championii*, showing the elongated aerial roots, lateral inflorescences and leafy stem with continuous apical growth. I. A sympodial caespitose orchid, *Appendicula bifaria*, showing five years' growth, the distichous leaves and the axillary inflorescences on the fourth year's growth.

