

中国兜兰属植物

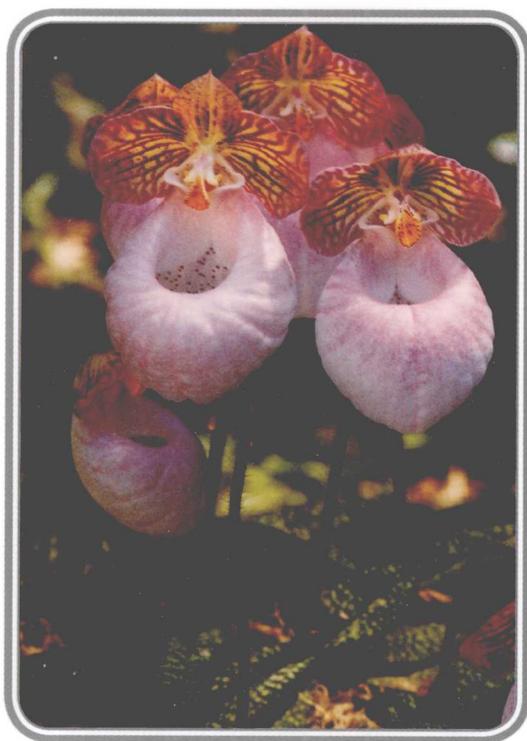
THE GENUS PAPHIOPEDILUM IN CHINA

刘仲健 陈心启 陈利君 雷嗣鹏 著
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内 容 简 介

兜兰属植物曾经令数代园艺家着迷。但直到20世纪80年代,原产中国的一些兜兰种类,如杏黄兜兰(*P. armeniacum*)、硬叶兜兰(*P. micranthum*)和麻栗坡兜兰(*P. malipoense*)等才开始崭露头角,继而风靡西方。它们曾多次获得在兰花界所能得到的最高奖,因此在那以后,中国的兜兰类植物吸引了全世界的目光。

本书所涉及的大多数国产种类都曾在野外考察过。本书为之提供了植物自身及其生境的彩色照片。至于非国产种类,除了进行分类整理外,对每个种至少提供一张彩照和一个简短的描述。为了满足外国读者的需要,所有分类学的描述和讨论都用中、英文书写。此外,对兜兰属的历史、形态与繁育、生态、地理分布、保育、杂交情况、栽培方法、繁殖技术以及病虫害防治等也做了简要介绍。

本书适合植物学领域的大专院校学生、教师,从事兰花研究的专业人员,以及兰花爱好者阅读参考。

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序

自从1996年我们在深圳建立兰科植物保护园之后，园中的兰花一直在急剧地增加，这主要是由于有关的执法部门不断地将没收的兰花送来我园进行栽培与保育。与此同时，我们对兰科植物的研究也在稳步地取得进展。在这个基础上，该兰花保护园于2005年升格为国家兰科植物种质资源保护中心，隶属于国家林业局主持的全国野生生物保护及自然保护区建设工程。其后不久，在同地成立了深圳市兰科植物保护研究中心。

该中心是一个非营利的机构，致力于兰花的研究和保护，其重点是有重要经济价值的兰科植物，如兜兰属（*Paphiopedilum*）、兰属（*Cymbidium*）和石斛属（*Dendrobium*）等。其中，兜兰属始终是重中之重。

我们大约在5年前开始对兜兰属植物进行野外观察，并着手编写这部著作。我们希望向读者详细介绍原产于中国的兜兰属的全部种类以及它们在中国的原生境。至于非中国产的种类，我们也力求提供尽可能多的彩照，以及每种有一个简要的描述。我们衷心希望这部著作将帮助读者更好地了解和欣赏这种迷人的兰花，同时鼓励他们和我们一起保护兜兰。

我们要向P. J. Cribb和O. Gruss表示诚挚的感谢，他们为我们提供了多篇在中国无法得到的有关新分类群的学术论文。我们还要感谢温垣章为我们提供了部分非国产种类的彩色照片；感谢叶德平和孙航分别为我们提供了白旗兜兰和秀丽兜兰的彩色照片；感谢赵木华、容健斯、陈旭辉、余大鹏协助野外调查工作；感谢李振宇、郑宇云、卢振强、李俊民、钟小红和王文斌在该书编写过程中所给予的诸多帮助。他们的盛情帮助对于完成该书的编写和出版是至关重要的。

Preface

Since our orchid conservation garden was set up in Shenzhen in 1996, the orchids there had increased greatly. This was mainly because the law-enforcing departments concerned continued to send the orchids confiscated to our garden for cultivation and conservation. At the same time, our researches on orchids were progressing steadily. On this basis, the orchid conservation garden was upgraded in 2005 to the National Orchid Conservation Center (NOCC), affiliated to the National Program for Wild Life Conservation and Nature Reserve Conservation, sponsored by the State Forestry Administration. Soon afterward the Orchid Conservation and Research Center of Shenzhen was founded in the same place.

The center is a non-profit organization dedicated to orchid researches and protection, and has concentrated its attention on the orchids of economic importance, such as *Paphiopedilum*, *Cymbidium* and *Dendrobium*. Among them *Paphiopedilum* always ranks foremost.

We began making field observation of paphiopedilums and writing this book some five years ago. We hope to detail for readers all the taxa of Chinese origin and their primal environment in China. As to the non-Chinese species, we have tried to provide more color photographs as possible, as well as each species a brief description. We sincerely hope that this book will help readers to better understand and appreciate these fascinating orchids and encourage them to join us in protecting them.

Our heartfelt thanks are due to P. J. Cribb and O. Gruss for their kindness in supplying us with many scientific papers on new taxa which are inaccessible in China. Our thanks also to Y. Z. Wen for his kindly providing some color photographs of the non-Chinese species, D. P. Ye and H. Sun for their color photographs of *P. spicerianum* and *P. venustum* respectively, M. H. Zhao, J. S. Rong, X. H. Chen and D. P. Yu for their assistance during our field work, and Z. Y. Li, Y. Y. Zheng, Z. Q. Lu, J. M. Li, X. H. Zhong and W. B. Wang for their help in the course of our writing this book. Their kind help is of great importance for our completing the compilation and publication of this book.

前 言

中国有丰富的拖鞋兰资源。《中国植物志》（第17卷）（陈心启，1999）中收录了50种杓兰属（*Cypripedium*）与兜兰属（*Paphiopedilum*）植物。自那以后又增加了许多新分类群和新记录种类，有些种类的分布范围也比预期的要大得多。例如，直到前不久，还有少数杓兰属的新种发现于云南东南部，而有些兜兰则在重庆南部和湖南南部被采到。可以期待还会有一些新种，特别是在杓兰属的无苞组（sect. *Trigonopedia*）和兜兰属的宽瓣亚属（subgen. *Brachypetalum*）中的新种，会在中国西部和西南部的更偏远地区被发现。

兜兰属宽瓣亚属具有许多在观赏上负有盛名的种类，它们主要产于中国西南部至越南北部的石灰岩地区。其中有一些种类，如杏黄兜兰（*P. armeniacum*）、麻栗坡兜兰（*P. malipoense*）和硬叶兜兰（*P. micranthum*），自大约20年前展现于西方以来，曾多次获得全世界兰界的最高奖，因而导致了在中国的大规模采挖和频繁发生非法出口到西方的事件（Chen, 1989, 1996a, 1996b; Cribb, 1998）。一些外国植物学家基于此种渠道得到的植物，近年来曾发表了多种原产于中国的兜兰属新分类群。

在此时期，大量走私的兜兰属植物，包括一些来自缅甸和其他东南亚国家的植物，被深圳有关的执法部门截获和没收，全部送来我们苗圃（深圳市梧桐山苗圃总场）进行栽培和保藏。在此基础上，我们于1996年建立了由刘仲健领导的兰科植物保护园。时至今日，共有500余种国内外兰科植物，其中包括几乎全部的国产和大多数非国产的兜兰属的种，已栽培于我们苗圃中，大多数生长良好。

兜兰属植物作为兰科中最诱人的花卉之一，在世界许多地方拥有为数众多的爱好者。虽然从20世纪80年代以来曾出版了不少有影响的专著（Karasawa & Saito, 1982; Birk, 1983; Atwood, 1984; Cribb, 1987, 1997, 1998; Braem, 1998; Braem et al., 1998—1999; Averyanov et al., 2003），但还需要为业余爱好者和专业工作者，特别是中国的读者，提供更多的读物。本书主要是基于活植物，对国产兜兰属植物进行分类学著作。大多数涉及的国产种类都曾多次在野外进行过观察，并将在本书中提供其生境的彩照。此外，对于该属的历史、形态、繁育、生态、地理分布、保育、杂交情况、栽培方法、繁殖技术和病虫害防治等也做了简要介绍与讨论。为了方便国外读者，书中第五章与第十章有关属的分类部分是用中英文书写的。

Introduction

China is rich in slipper orchids. There were 50 species of *Cypripedium* and *Paphiopedilum* recognized in the Flora Reipublicae Popularis Sinicae vol. 17 (Chen, 1999). Since then there have been many new taxa and new records known to us, and not a few taxa have been found to be of much wider distribution than expected. For example, until quite recently a few new species of *Cypripedium* were discovered in southeastern Yunnan, and some *paphiopedilums* were collected from South Chongqing and South Hunan. It is expected that there will be more new species of slipper orchids, particularly in *Cypripedium* section *Trigonopodia* and *Paphiopedilum* subgenus *Brachypetalum*, remaining to be discovered in remoter areas in western and southwestern China.

Paphiopedilum subgenus *Brachypetalum* has many well-known species of ornamental importance. They are mostly found in limestone areas in southwestern China and northern Vietnam. Some of them, such as *P. armeniacum*, *P. malipoense* and *P. micranthum*, have many times received the highest awards obtainable in the orchid world since they appeared in the West some 20 years ago. This caused large scale collection in China, and illegal exportation to the West to happen frequently (Chen, 1989, 1996a, 1996b; Cribb, 1998). Based on the plants obtained through such channels many new *Paphiopedilum* taxa of Chinese origin have been described by some foreign botanists in recent years.

At that time a large number of smuggled *Paphiopedilum* plants, including some Burmese and other Southeast Asian ones, caught and confiscated by the Shenzhen law-enforcing departments concerned, were all sent to our nursery, the Shenzhen City Wutongshan Nurseries, for cultivation and preservation. On this basis, our orchid conservation garden was set up in 1996, headed by Z. J. Liu. Today over 500 species of domestic and foreign orchids, including almost all Chinese and most foreign species of *Paphiopedilum*, have been cultivated in our nursery and most of them are growing very well.

Paphiopedilums, as one of the most attractive flowers in the Orchidaceae, have numerous lovers in many parts of the world. More readings are needed for both amateurs and professionals, especially for Chinese readers, though many influential books have appeared since the 1980s (Karasawa & Saito, 1982; Birk, 1983; Atwood, 1984; Cribb, 1987, 1997, 1998; Braem, 1988; Braem et al., 1998–1999; Averyanov et al., 2003). The present book is mainly a taxonomic treatment of Chinese taxa based on living material. Most of the Chinese species treated here have been observed in the wild for several times,

and will be provided with color photographs of their habitats in this book. In addition, their history, morphology, reproduction, ecology, geographical distribution, conservation, hybridization, cultivation, propagation, diseases and pests are briefly introduced and discussed. In order to meet the need of foreign readers, the chapters 5 and 10, about the classification of the genus, are written in both Chinese and English.

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第一章 历史

HISTORY

在兰科植物中，凡是具有硕大的兜形唇瓣而又有2枚能育雄蕊的种类都被西人称为拖鞋兰（slipper orchid）。只要是拖鞋兰，早先全部被放在杓兰属（*Cypripedium*）中，但由于体态和花的形态差异太大，后来又被分为4个属，即碗兰属（*Selenipedium*）、杓兰属、兜兰属（*Paphiopedilum*）和南美兜兰属（*Phragmipedium*），再加上后来发现的一个新属墨国兜兰属（*Mexipedium*），共有5个属。其中杓兰属与兜兰属在我国有广泛的分布。

兜兰属是1886年由德国植物学家E. H. Pfitzer建立的。他把产于热带亚洲的、具二列的基生叶的种类从杓兰属中分出来另立新属。实际上，最早持有此种观点的是美国植物学家C. S. Rafinesque。他在1838年就基于最早引入英国栽培的秀丽杓兰（*Cypripedium venustum* Sims）与波瓣杓兰（*C. insigne* Lindl.），分别建立了新属 *Stimegas* 和 *Cordula*。虽然有优先权，而且 *Cordula* 还得到R. A. Rolfe等著名兰科研究者的认可，但国际植物命名法规还是根据大多数植物学家的意见，废弃了 *Stimegas* 和 *Cordula*，而保留了 *Paphiopedilum* 作为属名。

Paphiopedilum 来自希腊文，意为女神Aphrodite（即希腊的维纳斯）的拖鞋。该属中确有许多种类的囊状唇瓣基部具有长柄，颇似高贵女性的拖鞋。

兜兰属为热带亚洲属，主要分布于东南亚至喜马拉雅山低地至中国西南部，只有少数种类到达新几内亚和所罗门群岛。目前总共有79个野生种记录在案，其中约1/3产中国。就种类而论，中国应是世界上兜兰属植物最丰富的国家。

由于兜兰属中几乎所有的种类都具有艳丽的花朵和较长的开花期，在19世纪就开始被园艺界广泛引种栽培。其中早期被引入英国栽培的是原产于印度的秀丽杓兰[即秀丽兜兰（*Paphiopedilum venustum*）]。它在1819年开花，于1820年被正式描述与命名发表，成为兜兰属第一个新种。翌年，另一种产于印度（今孟加拉国）Sylhet的波瓣杓兰[即波瓣兜兰（*Paphiopedilum insigne*）]也被发表了。这两个种是兜兰属中最早被正式命名的种。后来被Rafinesque分别作为他的两个新属 *Stimegas* 与 *Cordula* 的模式种。*P. insigne* 也被E. H. Pfitzer选为 *Paphiopedilum* 的模式种。

在国产种类中最早被引种栽培和命名发表的是紫纹杓兰（*Cypripedium purpuratum*）[即紫纹兜兰（*Paphiopedilum purpuratum*）]。它的模式产于中国香港，于1837年正式发表，是世界上第3个被正式记录的兜兰。但是，据文献记载，这个种早在1760年以前在英国的Hackney的Loddiges苗圃就有栽培。这应是最早引入欧洲栽培的兜兰，其原产地无疑是中国香港。

英国园艺界自19世纪初开始，对引种栽培兜兰的兴趣有增无减。据报告，在19世纪60年代初，已有16种野生兜兰被引入英国。可惜当时的栽培技术欠佳，主要是未

能充分了解兜兰对通风排水的特殊需求,因而只培育出少数的人工杂种,如1869年第一个被命名的杂种哈氏兜兰(*Paphiopedilum Harrisianum*) (*P. barbatum* × *P. fairrieanum*)和翌年第二个被命名的杂种旗瓣兜兰(*Paph. Vexillarium*)。这种形势一直延续到19世纪末和20世纪初才得以扭转。此时,已有约40种的野生兜兰被成功引种,培育出的人工杂种也急剧增加。到了1900年,人工杂种的数目已达到414种之多。

与此同时,植物学家对兜兰属的系统研究也在不断深化。例如,E. H. Pfitzer在1886年建立兜兰属后,又分别于1894年和1903年对该属进行了全面的研究。但是,此种研究在后来中断了很长的时间,直到20世纪70年代才逐渐恢复,如F. G. Brieger (1973)、K. Karasawa和K. Saito (1982)、J. T. Atwood (1984)、P. J. Cribb (1983, 1987, 1997, 1998)、G. J. Braem (1988)、G. J. Braem等(1998–1999)、L. Averyanov等(2003)的研究。这些研究极大地深化了世界对兜兰属植物的认识。

兜兰在我国民间被称为拖鞋兰、仙履兰、袋兰、熊谷兰或敦盛草,一直到近代才由学术界起用兜兰一名。后一名称在中国大陆已被广泛认可和使用,但在中国香港和中国台湾至今仍沿用拖鞋兰或仙履兰,有时还称为芭菲尔鞋兰。西方人对兜兰情有独钟,长期以来拥有数量很大的爱好者,因而其中一些杂交种甚至野生种流入香港和台湾民间是不足为奇的,但后两地的大规模栽培,甚至发展成产业的,均始于20世纪后期,主要是80年代以后。其中台湾发展最快,兜兰的繁殖与育种已完全规模化、产业化,成为花卉业,特别是兰花产业中的一大支柱。然而在中国大陆,兜兰的栽培、繁殖与杂交育种,仍处于起步阶段,远未进入商业化生产,而且,所拥有的爱好者也为数甚微。

我国学术界对兜兰属的研究同样也起步较晚。最早的研究者和奠基人应是唐进和汪发缙教授。他们从20世纪30年代开始全面研究中国兰科植物,也包括兜兰属。其间在1936–1938年曾到欧洲各国大标本馆研究了保藏在那里的中国和邻国兰科植物标本。他们在回国后,于1940年发表了长瓣兜兰(*Paphiopedilum dianthum*)和小叶兜兰(*P. barbigerum*),后来在1951年又发表了另一个新种硬叶兜兰(*P. micranthum*)。这是中国植物学家最早研究兜兰属植物的重要成果。

在此以后,陈心启和刘芳媛(1982)发表的新种杏黄兜兰(*Paphiopedilum armeniacum*),陈心启和吉占和发表的新种麻栗坡兜兰(*P. malipoense*),以及他们首次向全世界展示硬叶兜兰的美貌与风姿,在世界和园艺界引起了极大的关注。这三种兜兰叶片斑斓,花朵艳丽,加上硕大、浑圆的唇兜(即俗称的拖鞋),故又有“金拖”(杏黄兜兰)、“银拖”(硬叶兜兰)和“玉拖”(麻栗坡兜兰)之雅称,在世界性的兜兰属植物展览中出尽风头。例如,当杏黄兜兰于1983年首次在美国展出时,人们无不为其金碧辉煌,令人眩目的花朵所折服,以致评委们给出美国兰花协会历来大奖中破纪录的最高分(92分)。此后直到1992年,杏黄兜兰及其变种与杂种,共获得美国兰花协会大奖71次,最高评分达97分。这在整个兰花史上是没有先例的。

随着新种的发现和继后记录种的增加,在20世纪90年代后期出版的《中国兰花全书》(陈心启和吉占和,1997)和《中国植物志》(第17卷)(陈心启,1999)中,

收录的中国野生兜兰达到了18种。进入21世纪以后，形势有了很大的变化，大量开展了对兜兰属的专业性调查与考察，以及对分类、生态、传粉、杂交、繁殖、保育等方面的研究，兜兰属国产种类又有了明显的增加。

其中最为重要的是，中国兰科植物种质资源保护基地的建立。该基地位于深圳，以保护兜兰属植物为重点，是由刘仲健领导的研究组在20世纪后期建立的。基地通过多年的调查、考察与研究，收集和引种了全部国产兜兰种类，其中包括许多新种和新记录种，如文山兜兰 (*P. wenshanense*) (新种) 和德氏兜兰 (*P. delenatii*) (新记录种) 等，国外的兜兰野生种也有大量的引种。目前兜兰野生种的总数达到75种，成为世界上最大的兜兰属种质资源保护基地。目前该基地已成为中国野生动植物保护及自然保护区建设工程属下的全国兰科植物种质资源保护中心和深圳市兰科植物保护研究中心。

该中心已开展兜兰属植物的传粉生物学与保育生物学等多方面的研究，并进行回归自然的试验。它或许是世界上最大、也是惟一的以保护与研究兜兰为重点的机构。该机构的建立，应是我国兜兰研究史上的里程碑，也是世界兜兰研究史上的重大事件。

第二章 形态与繁育

MORPHOLOGY AND REPRODUCTION

一、营养器官形态 Vegetative morphology

兜兰属植物的基部一般都具有很短的茎，完全包藏于二列套叠的叶基内，茎下端与缩短的根状茎相连接（见图2-1）。据报告，布干岛兜兰（*P. bougainvilleanum*）生长于山地林下苔藓深处的植株具有延长的茎，茎上生有间隔明显的叶（Cribb, 1998）。实际上，在栽培的情况下，这种现象并不罕见，例如同色兜兰（*P. concolor*）、胼胝兜兰（*P. callosum*）、布玲兜兰（*P. bullenianum*）、紫纹兜兰（*P. purpuratum*）、彩云兜兰（*P. wardii*）、麻栗坡兜兰（*P. malipoense*）等，在温室中被深埋时经常会出现茎延长或基部的根状茎变长的现象。有些种类如根茎兜兰（*P. rhizomatosum*=*P. areeanum*），则在常态下具有长达8—10 cm、粗0.8—1.2 cm的地上茎（或根状茎）茎段。许多茎段相连接，有时长可达100 cm，匍匐于地面。

大多数兜兰属植物在地下都不具延长的根状茎或走茎（stolon）。只有少数种类例外。例如，产于印度南端的南印兜兰（*P. druryi*）就具有长达1 m以上的地下根状茎。此种根状茎粗壮，横走，每隔一定距离生有植株。又如，硬叶兜兰（*P. micranthum*）和杏黄兜兰（*P. armeniacum*）等，在被枯枝落叶或泥土掩埋后，常会生出1至数条细长的走茎，走茎顶端生有小植株，此类小植株可在母株周围排成密丛状。但在正常生境下，则走茎很短或不存在。

兜兰的叶近基生，呈二列排列于缩短的茎上，对摺，一般为狭矩圆形至椭圆状矩圆形，中等大，很少长度达到50 cm以上，宽度超过8 cm，如巨叶兜兰（*P. gigantifolium*）。

叶面有深浅绿色或绿色与灰白色或银灰色相间的网格斑，是一部分兜兰属植物的重要特征，但更多种类的叶片为单一的绿色。有些具网格斑的种类会出现网格斑模糊或不明显的个体，如卷萼兜兰（*P. appletonianum*）；有些具单一绿色叶片的种类会出现模糊的网格斑，如白花兜兰（*P. emersonii*）。叶背一般为浅绿，但有些种类具紫色斑点，有些种类的紫色斑点极其稠密，甚至使整个叶背变为紫色，如同色兜兰（*P. concolor*）。

二、花的构造 Floral structure

兜兰属植物大多数具单花，这实际上是由多花的总状花序减退而成的，但是多

花的总状花序也见于少数种类，包括一些单花的种类中。其中最极端的例子是多花兜兰 (*P. victoria-regina*)，最高的记录是单个总状花序具33朵花（但有的种类不是同时开放的），这在兜兰属中是独一无二的例子。

兜兰属植物的子房1室。在杓兰亚科的5个属中，只有碗兰属与南美兜兰属子房3室，余下的杓兰属与墨国兜兰属也是1室。此3个属的1室子房均为侧膜胎座。

花被由1枚中萼片、1枚合萼片、2枚花瓣和1枚唇瓣组成（见图2-1）。

中萼片的形状、大小、姿态在不同的种类中有种种变化，或直立或俯倾而覆盖于唇瓣囊口之上，或后卷而形成喇叭状。2枚侧萼片已合生而成合萼片，但背面仍保留2条龙骨状突起，先端亦多少2裂。

花瓣明显不同于中萼片，形状的变化幅度也远大于中萼片，常扭曲或生有附属物。最极端的例子是变成下垂的长丝带，如长须兜兰 (*P. sandirianum*)，花瓣长度可达100 cm。

唇瓣是由基部的柄（或爪）和顶端的兜组成的。柄是由三裂唇瓣的唇盘和侧裂片形成的，而兜实质上是由中裂片变态而成的。兜兰属中的唇瓣基本上有两种类型。第一种类型是基部的柄较短，顶部的兜近球形、椭圆形或卵形，先端边缘内弯或内卷，如硬叶兜兰、杏黄兜兰、同色兜兰等。第二种类型是基部的柄较长，顶端的兜大多椭圆形至卵形，先端不内弯或内卷，两侧常多少呈耳状，整个轮廓颇似倒盔状，如卷萼兜兰、长瓣兜兰 (*P. dianthum*) 等。兜的底部有种种毛被，为昆虫传粉起引导作用。

蕊柱是由2枚位于两侧的能育雄蕊、1枚位于上方的盾状退化雄蕊和1个位于下方的柱头组成的。退化雄蕊的形状在属中有很大的多样性，是鉴别种类的重要依据，但在有些种类中，它自身也有种种变化，如同色兜兰的退化雄蕊。

花粉在大多数种类中均黏合成松散的不规则团块，但在杏黄兜兰、硬叶兜兰和麻栗坡兜兰中，呈松散的颗粒状。后者似乎是较原始的性状。全属均为单体花粉而非四合花粉，形态差异不大。

三、果实与种子 Fruit and seeds

兜兰果实为蒴果，在受精后通常需要4—6（—12）个月才能成熟，一般含有数万粒种子。以杏黄兜兰为例，每个蒴果含40000—50000个种子（刘仲健等，2006）。蒴果有6个果瓣，在近顶端处开裂为6个裂口。种子为梭形，长度一般在0.4—1.1 mm之间，中央有1个小胚，外围为半透明的种皮。种子是靠风力传播的，一般在感染共生真菌菌丝后很快萌发，否则就会丧失萌发力。萌发一般是在黑暗的环境中进行的。有些兜兰的种子在成熟后有休眠期，这或许与生长环境有一定的关系。

四、传粉 Pollination

在杓兰亚科 (*Cypripedioideae*) 中, 杓兰属植物的传粉已有较充分的研究, 大多数是由蜂类传粉的。受欺骗的昆虫在掉入囊中后, 只有沿着囊底的特定通道, 先触及柱头, 然后从基部一侧出口逃逸, 此时必须挤压雄蕊, 带走花粉。

兜兰属约有79种, 但其中只有5种的传粉被较详细研究过。它们是若氏兜兰 (*P. rothschildianum*) (Atwood, 1985)、紫毛兜兰 (*P. villosum*) (Banziger, 1996)、杏黄兜兰 (*P. armeniacum*) (刘仲健等, 2006)、小叶兜兰 (*P. barbigerum*) (刘仲健等, 待发表) 和紫纹兜兰 (*P. purpuratum*) (刘仲健等, 待发表)。

据推测, 花的结构接近杓兰属的一些种类, 如麻栗坡兜兰、杏黄兜兰、硬叶兜兰等, 其传粉媒介可能也是蜂类, 因为它们散发出的气味也多为果香或蜜香, 而且唇瓣内卷的边缘对于防止较大型的蜂类从原路逃脱是有积极意义的。对杏黄兜兰的传粉观察表明, 它们也是实行食源性欺骗 (food deception) 的传粉“策略”。与杏黄兜兰伴生而且花期相同植物是金丝桃科的黄花香 (*Hypericum beanii*)。此种植物的花与杏黄兜兰的花色泽相同, 并具有淡紫褐色的雄蕊群, 与杏黄兜兰退化雄蕊的斑纹相似, 而且还发出淡淡的油菜花香。这种香味与杏黄兜兰花的香味相同。显然, 杏黄兜兰是模拟黄花香的花色、花姿与花香, 欺骗寻找蜜源的昆虫。曾观察到1种蝇类和7种蜂类访问花朵, 但真正的传粉者为长尾管蚜蝇 (*Eristalis tenax*)、莫芦蜂 (*Ceratina morawitzi*) 和领淡脉隧蜂 (*Lasioglossum pronotale*)。也有人认为硬叶兜兰的花色可能模拟某种伴生植物杜鹃花 (*Rhododendron* sp.) (Averyanov et al., 2003)。

对若氏兜兰和紫毛兜兰的观察与研究表明, 它们也是靠欺骗传粉的。前者的退化雄蕊上的腺毛可能是模拟蚜虫产卵地, 从而引诱雌性食蚜蝇 (*Dideopsis aegrota*) 来产卵, 因为食蚜蝇的幼虫是靠食蚜虫长大的; 后者的传粉媒介也是雌性食蚜蝇, 但该研究认为是花朵散发出的尿味和闪闪发光的、极像花蜜的退化雄蕊表面, 欺骗了贪食的食蚜蝇为其传粉。

我们对小叶兜兰 (*P. barbigerum*) 的观察研究表明, 传粉的方式也大同小异, 传粉媒介也是雌性食蚜蝇, 主要是黑带食蚜蝇 (*Episyrphus balteatus*)。食蚜蝇进入囊状唇瓣后, 大约需要3.5 min才能带着花粉从基部的出口逃出。有趣的是, 小叶兜兰的唇瓣内也发现有活的蚜虫, 或许未必是纯粹的欺骗, 而是欺骗加互利 (刘仲健等, 未发表)。

其他一些种类, 如紫纹兜兰 (*P. purpuratum*), 据我们的观察也是用欺骗的方法引诱食蚜蝇为其传粉的。若氏兜兰、紫毛兜兰、小叶兜兰和紫纹兜兰都属于较进化的兜兰亚属 (*Paphiopedilum* subgen. *Paphiopedilum*) 的成员。该亚属中所有种类的唇瓣都呈倒盔状或拖鞋状, 囊深口大, 前方没有内卷的边缘。显然, 这种结构对于防止体型较小的食蚜蝇从原路逃脱是绰绰有余的了。就目前所知, 该亚属中许多种类是由不同种类的食蚜蝇为其传粉, 尤以雌性为多, 而且全都是采用欺骗的“策略”。雌性食

蚜蝇寻找产卵地应是主要的陷阱，虽然寻找食物也不应排除。看来模拟产卵地的欺骗是此类兜兰属的共同特点，尤其是近距离的欺骗更应如此。传宗接代和寻觅食物是动物的两大本能，兜兰属植物以此进行诱骗，做起了“没有本钱的买卖”，而且卓有成效，着实令人惊叹！

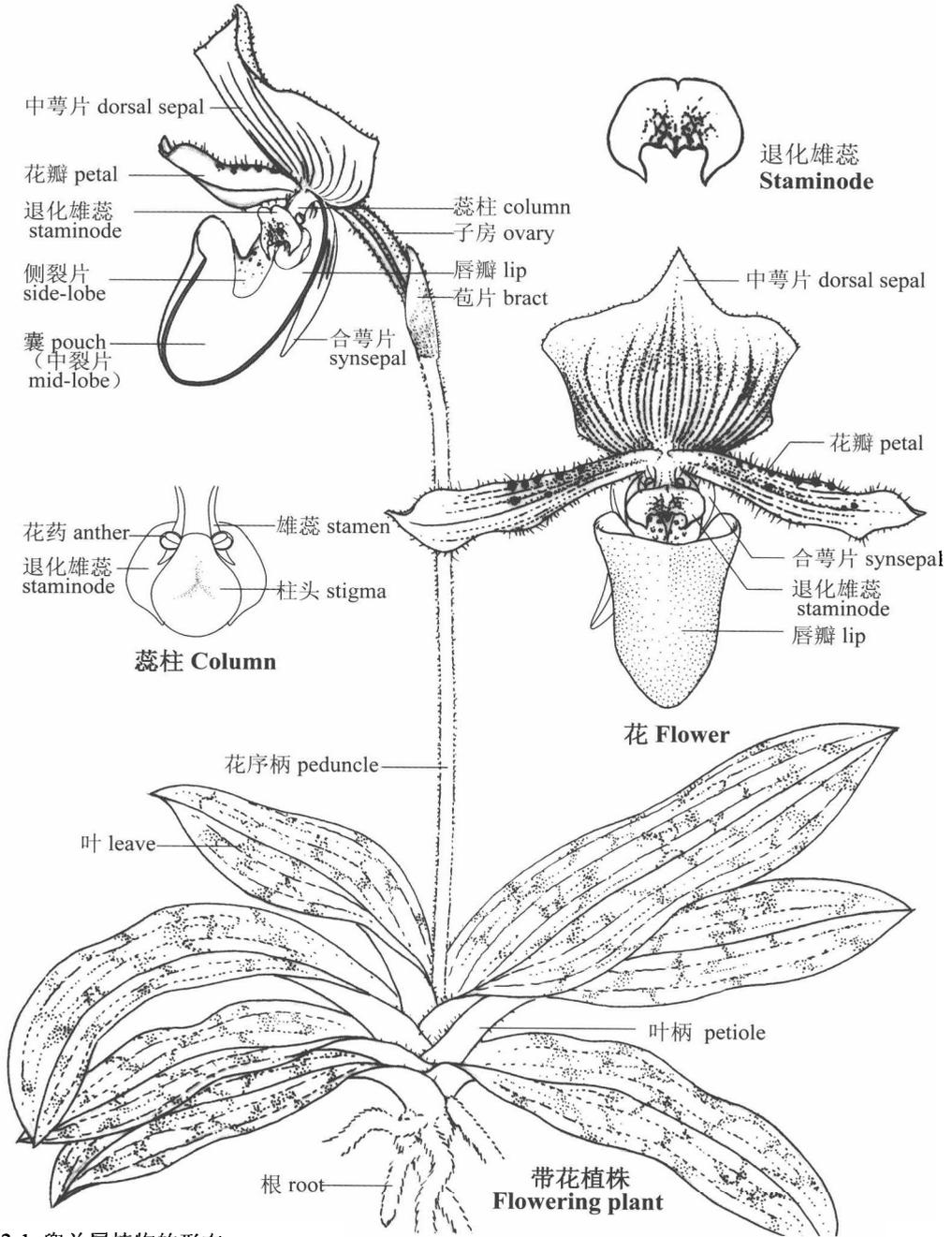


图 2-1. 兜兰属植物的形态
Fig. 2-1. The morphology of *Paphiopedilum*

第三章 生态与地理分布

ECOLOGY AND GEOGRAPHICAL DISTRIBUTION

一、生态 Ecology

兜兰属植物大多数生于地面或积土的岩石表面或岩缝中，较少数着生于树上，也就是说有地生、石上附生和树上附生之分。但有些研究者认为，兜兰属植物全部是附生的，做上述区分是错误的，因为兜兰的地生与真正的地生兰，如独蒜兰（*Pleione* spp.）、火烧兰（*Epipactis* spp.）和杓兰（*Cypripedium* spp.）是完全不同的，若用栽培上述地生兰的办法栽培兜兰，短期内就会死亡（Braem et al., 1998）。

诚然，生于地面的兜兰不是典型的地生兰，它们需要良好的通风、排水条件，与附生兰的要求大致相近，只是程度较低而已。在兰科中，有一些属的生态幅度是比较广的，既有地生种类，也有附生种类，如羊耳蒜属（*Liparis*）和兰属（*Cymbidium*）。兰属的绝大多数种类都已被引种栽培。其中地生种类、石上附生种类与树上附生种类均可以用盆栽，基质也大致相同，只是后者需要更好的通风、排水条件而已。这种情况与兜兰属植物颇为相近。该两属中不论地生还是树上附生的种类都有肥厚的根，亦即具有根被很厚的根，适于附生生活。不同的是兰属的附生种类更多、分布更广。

但是，兰属与兜兰属的附生种类一般都长在树杈或树干凹缺处，与典型的附生兰，如蝴蝶兰属（*Phalaenopsis*）、钻喙兰属（*Rhynchostylis*）以及万代兰族（*Vandaeae*）的其他成员，可以附着于树皮上生长，又有明显的差别。地生种类的情况也同样是千差万别的。绶草（*Spiranthes sinensis*）和火烧兰属、沼兰属（*Malaxis*）的一些种可以在草甸甚至沼泽中生长，而杓兰属植物则多在排水良好的土地上生长。独蒜兰貌似地生，而实际上是半附生的，需要更好的通风、排水条件。因此，为方便读者，我们仍然主张将兜兰区分为地生、石上附生和树上附生三类，但其间的界限并不是绝对的，特别是在地生与石上附生之间。有些地生的也能上树，例如，杏黄兜兰大多是地生的，也有少数是石上附生的，个别的植株也能上树。在国产种类中，紫毛兜兰（*P. villosum*）与飘带兜兰（*P. parishii*）是树上附生的。其余的种类大多生于多石、腐殖质和枯枝落叶层深厚的地上，或岩石表面积土或石壁缝隙中。我们至今仅发现紫纹兜兰在深圳梧桐山上的居群中的许多植株生于深厚土壤中或有涓流的地面上。

兜兰属中许多种类是石灰岩地区的特有种类，如硬叶兜兰、麻栗坡兜兰、巨瓣兜兰（*P. bellatulum*）、小叶兜兰、同色兜兰、白花兜兰（*P. emersonii*）、亨利兜兰（*P. henryanum*）、长瓣兜兰（*P. dianthum*）、巧花兜兰（*P. helenae*）、带叶兜

兰 (*P. hirsutissimum*) 等。这些种类往往成片生长于树木丛生而又多少透光的石灰岩山地上。有些种类如紫纹兜兰 (*P. purpuratum*)，在广东地区生于次生林下的酸性多石土壤或冲积土上，花期为10—12月，但在云南东南部至广西西部则生于石灰岩带微碱性的土壤上。后者花期为6—7月，偶尔也可延到9—10月。两者花的结构稍有差别，但植株形态、生境与花期则明显不同。深圳兰科植物种质资源保护中心将两者引种栽培在一起，花期仍保持不变。石灰岩地区的植物曾被描述为新种——夏花兜兰 (*P. aestivum*)。

除石灰岩地区特有的种类外，其他种类大多生于多石和腐殖质丰富的酸性山地上，对生境的要求也同样是排水、通风好，有一定的荫蔽，又能透光，而且湿润的地方。但其分布通常较为分散。

最近研究表明，兜兰属的某些种类，如杏黄兜兰对于生态环境的变化有很强的适应能力 (刘仲健等, 2006)。野外观察可以看到，当杏黄兜兰的植株被枯叶和疏松的泥土覆盖时，或整个植株被连根冲出土层之外时，它会伸出1至数条横走的走茎，以穿出覆盖层或进入土层，以此种方式繁殖新个体。但在正常的生态环境中，未必都有横走的走茎。再者，它对自身开花、分株、结实后的老化进程还有调控能力。当生态环境优越时，分株可经历4年才老化干枯，而在生境恶劣时，结实后就长出新分蘖芽，随后母株也就开始老化。这显然是把有限的资源留给生命力强的新植株。这种现象是很值得注意的。

兜兰属的物候期有较大幅度的变化，花期遍及一年四季。不像温带的杓兰属，基本上都是5—7月开花。只有个别种类，如绿花杓兰 (*Cypripedium henryi*)，生长于云南东南部的个体会在春季开花。秋冬季开花的兜兰有：波瓣兜兰 (*P. insigne*) (10—12月)、小叶兜兰 (10—12月)、紫毛兜兰 (*P. villosum*) (11月至翌年3月) 等，麻栗坡兜兰为9月至翌年3月，紫纹兜兰为10月至翌年1月。其余的大多为夏季开花。亚热带南缘与热带北缘的气候，为兜兰属植物的开花、结果和种子的传播、萌发提供了良好的环境条件。

二、地理分布 Geographical distribution

兜兰属主要分布于热带亚洲，以热带地区为中心，向北扩展至中国的亚热带地区、印度东北部和喜马拉雅山低地，向东南到达新几内亚岛和其东面的所罗门群岛。

作为热带与亚热带南缘的属，其地理分布中最有趣的现象是：东北面不见于我国台湾岛和日本琉球群岛，东南面不见于澳大利亚，西面不见于斯里兰卡岛和印度腹地的大部分地区，而只有1个种孤立地生存于印度次大陆的南端。后者可能是细小种子长距离分布的偶然事件。

这种分布式样似乎表明，该属在地史上是较晚出现的植物群，虽然在系统上，杓兰亚科是一个原始的类型。

兜兰属在我国的分布大多在海拔1700 m以下，只有杏黄兜兰可达2250 m，长瓣兜兰可达2350 m，向北可分布至广西西部和贵州西南部的石灰岩山地。而其近亲种飘带兜兰 (*P. parishii*) 则分布于泰国、缅甸至云南南部的西双版纳，生于树杈上；此种生于云南南部的海拔为1000—1300 m，但在缅甸与泰国海拔可上升至2200 m。同色兜兰与巨瓣兜兰这一对近亲种也有类似情况。两者均生长于石灰岩山地，分布区也大致相似，但同色兜兰多生于海拔300—1400 m处，而巨瓣兜兰更耐寒，海拔可上升至1800 m。巨瓣兜兰沿缅甸和泰国分布至云南和广西，但不见于海拔较低处，越南和老挝未见此种的踪迹。

兜兰属与杓兰属是有明显亲缘关系的，尤其是兜兰属中具球形唇瓣的种类。兜兰属中最原始的种类，如麻栗坡兜兰、杏黄兜兰、硬叶兜兰、德氏兜兰等均主要产于中国西南部的石灰岩山地。其中麻栗坡兜兰 (*P. malipoense*) 甚至分布到重庆市南川县的金佛山，接近北纬的29°，是该属分布最北的一个分类群。

杓兰属是一个泛北温带属，有东亚与北美两个分布中心。而中国西南部山地乃是该属种类最为丰富的地区，也是杓兰属中最原始的种类暖地杓兰 (*C. subtropicum* S. C. Chen et K. Y. Lang) 的家乡。杓兰属向南可以到达西藏的墨脱和云南的麻栗坡，或许还有海南岛尖峰岭的山顶。有趣的是，杓兰属植物大多生于酸性土的山坡上，较少与石灰岩的生境有联系，但兜兰属的原始类群却大多是石灰岩地区的“居民”。从这里可以看出：热带与亚热带南缘的兜兰属是温带的杓兰属在向南部扩展中，在温度和生境剧烈变化中出现的替代属。虽然它们之间有明显的亲缘关系，但兜兰属究竟来自何种的古杓兰或杓兰的何种祖先，尚有待于进一步的研究。

兜兰属最密集的分布中心是在中国的云南南部、广西西南部以及越南北部，有25—30个种产于此地。中国目前是世界上兜兰种类最多的国家，总种类达到27种，其次是越南和印度尼西亚。从中国西南部至越南北部的广大地区，不仅拥有最多的种类，而且原始的种类几乎集中在这个地区，这也从另一个侧面说明了兜兰属的起源地很可能就在这个地区。

第四章 保育

CONSERVATION

我国对兜兰属植物的栽培、开发是起步较晚的，虽然美丽非凡的硬叶兜兰 (*P. micranthum*) 发表于1951年，但由于当时是根据未完全开放的花蕾描述的，取名为“micranthum”（意为“小花”），故未曾引起注意。直到1982年，在发表中国产的另一个新种杏黄兜兰时，文中对硬叶兜兰的花进行补充描述，才引起广泛的注意（陈心启和刘芳媛，1982）。此后不久，又发表了另一个美丽的新种——麻栗坡兜兰 (*P. malipoense*)，在全世界整个兰界和园艺界引起了巨大的轰动，尤以杏黄兜兰为甚，连续获得美国兰花协会、英国皇家园艺协会以及其他多项最高奖。但是，随之而来的是疯狂的采集。仅1985年，就有60 000株的硬叶兜兰与杏黄兜兰非法走私到香港，然后出口到其他国家（Stewart, 1987; Chen, 1989, 1996a, 1996b）。据报告，美国加利福尼亚州的一位苗圃商人，从1985年10月至1986年4月的6个月中，就通过香港进口35 000苗杏黄兜兰，全部采自云南野外，亦即全部是野生苗（Cribb, 1998）。麻栗坡兜兰的命运也同样不容乐观。此种植物不具有像硬叶兜兰和杏黄兜兰那种生命力强大的地下走茎和有性繁殖能力，一旦被采挖，就难以恢复。

在兜兰属中，白花兜兰 (*P. emersonii*) 与亨利兜兰 (*P. henryanum*) 是基于从中国走私出口的植物加以描述和发表的。此两种兜兰在国内市场上时有所见，尤其是前者，在20世纪后期，曾有数千株出售于广西至广州的市场上。其他兜兰，如小叶兜兰 (*P. barbigerum*)、长瓣兜兰 (*P. dianthum*)、同色兜兰 (*P. concolor*)、巨瓣兜兰 (*P. bellatulum*) 也都能在市场上买到，甚至汉氏兜兰 (*P. hangianum*) 和彩云兜兰 (*P. wardii*) 也能买到。汉氏兜兰可能来自越南，彩云兜兰则多来自云南保山的芒宽。

继后，随着国际市场对于中国兜兰属原生种需求逐渐趋于饱和，中国兜兰属出口贸易在经历了20世纪80年代中期至90年代中期的高峰后，贸易量逐渐减少，直接采挖的压力也减轻了（罗毅波等，2003）。应当说，深入地调查和评估兜兰属植物的野生居群，积极进行居群遗传学、传粉生物学和保育生物学的研究，开展兜兰属植物繁殖和回归自然的试验，力求在21世纪把丢失的兜兰重新补回大自然，并不是没有可能的。

根据我们对紫纹兜兰 (*P. purpuratum*) 与杏黄兜兰的传粉生物学与保育生物学的研究，它们在野外的生长与结实情况均十分良好，紫纹兜兰在广东深圳梧桐山非石灰岩地区的次生阔叶林下，长势茁壮，进行人工种植的植株，亦能分蘖、开花、结果。紫纹兜兰是由短刺刺腿食蚜蝇 (*Ischiodon scutellaris*) 传粉的，结实率达85.25%（刘仲健等，2004）。

杏黄兜兰是中国云南怒江东岸的特有种，大多着生于石灰岩山体的东北坡上，

大多数为地生，在灌丛、草丛、裸露坡地、岩缝上呈斑驳状分布。在郁闭度0%—90%的林下均能生长，但到了海拔2250 m以上则不见生长。此种植物生命力极强，具有天然回归与复壮的能力。野外调查发现，在1984年为准备修建水电站而开挖的人工斜坡与渠面（海拔1900 m）和毁弃的寺庙（海拔2130 m）的残垣边有许多正常生长的居群；在人工杉木疏林下和人工伐木迹地草丛内也有大量植株生长。杏黄兜兰是由长尾管蚜蝇（*Eristalis tenax*）、莫芦蜂（*Ceratina morawitzi*）和颌淡脉隧蜂（*Lasioglossum pronotale*）传粉的。结实率约为1/3，但每个蒴果有多达50000个的种子（刘仲健等，2006）。

通过对上述两种兜兰（石灰岩与非石灰岩生境）的研究表明，它们主要的威胁来自大量的人工采挖和对生境的破坏，而非自身存在生理学或生物学的缺陷所致。兜兰属植物的繁殖，特别是实验室中大规模种苗繁殖，在兰科中是难度最大的属之一。组织培养只取得很有限的进展，而种子无菌萌发也只在部分种类中进行过试验。在国产种类中，已进行种子无菌萌发试验的种类有杏黄兜兰、硬叶兜兰、德氏兜兰、巨瓣兜兰、带叶兜兰、波瓣兜兰、紫纹兜兰等，已取得部分的成功。其中，对大规模繁殖的种苗已经进行回归自然试验的有杏黄兜兰、硬叶兜兰、麻栗坡兜兰、紫纹兜兰等。此项工作大多数是在全国兰科植物种质资源保护中心（深圳）与有关自然保护区协作下进行的，目前也已取得初步的成功。诚然，在积极开展有关兜兰属保护生物学研究的同时，大力发展和完善原地保护和迁地保护工程，积极开展回归自然的系统工程，应是保育工作的重要环节，而迁地保护工程中，繁殖和回归自然工作也应是不可或缺的。

第五章 兜兰属的分类

CLASSIFICATION OF PAPHIOPEDILUM

一、属下分类

Infrageneric classification

兜兰属 (*Paphiopedilum*) 是一个十分自然的属。根据唇瓣的结构, 该属很容易分成2个截然不同的群: ①唇瓣的囊近球形、椭圆形或卵形, 基部具短柄, 先端边缘明显内弯或内卷; 囊口略小于囊身, 两侧不具耳状物。②唇瓣的囊倒盔状或拖鞋状, 基部具较长的柄, 先端边缘不内弯或内卷; 囊口大于或等于囊身, 有时两侧呈耳状。J. T. Atwood在1984年据此特征将兜兰属划分为2个亚属, 即宽瓣亚属 (*Paph. subgenus Brachypetalum*) 与兜兰亚属 (*Paph. subgenus Paphiopedilum*)。这种见解, 基本上为P. J. Cribb在1987年所采用。

根据K. Karasawa (1979—1986) 以及Karasawa和Aoyama (1980) 对细胞学的研究, 兜兰属的染色体基数为 $2n=26$, 但在有些类群, 诸如匙瓣组 (sect. *Cochlopetalum*) 和疣点组 (sect. *Sigmatopetalum* = sect. *Barbata*) 之中, 其染色体基数为 $2n=30-36$ (—37?) 和 $2n=28-44$ 。后两群可能代表了属中两个进化的类群, 其染色体基数被认为是通过缺失或获得1个或多个染色体, 而自 $2n=26$ 演化而来的。Karasawa和Saito (1982) 将兜兰属分成6个亚属和13个组, 但其系统未被广泛地接受, 只有他们建立的新亚属小萼亚属 (*Paph. subgenus Parvisepalum*) 被近代学者, 如P. J. Cribb (1998) 和Braem等 (1998—1999) 所采纳。

然而, 事实上, 小萼亚属和宽瓣亚属 (*Paph. subgenus Brachypetalum*) 之间在形态上并无重大的差别, 如果我们将它们作为两个亚属处理, 那么也需要将另一个亚属, 即兜兰亚属 (*Paph. subgenus Paphiopedilum*) 再进一步划分成更多的亚属, 正如Braem等 (1998—1999) 所做的那样。在一个中等大小的属进行如此细致的划分似乎是太繁琐了。因此本书采用J. T. Atwood (1984) 的观点, 承认2个亚属, 即宽瓣亚属和兜兰亚属, 而将*Parvisepalum*降为宽瓣亚属下面的一个组。在兜兰亚属中则采用P. J. Cribb (1998) 的观点, 承认5个组。如是则兜兰属共有2个亚属8个组为本书所承认。

兜兰属中亚属与组的检索表

1. 唇瓣的囊近球形、椭圆形或卵形, 基部有短柄, 前端具内弯或内卷边缘; 囊口通常小于囊身; 花瓣长度不足宽度的1倍.....1. 宽瓣亚属 *Paph. subgenus Brachypetalum*
2. 囊近球形, 质地薄, 前端具较宽阔的内弯或内卷边缘 (宽3—4 mm); 囊口明显

- 小于囊身。
3. 叶矩圆形至椭圆形，上面具明显的网格斑..... (1) 小萼组sect. *Parvisepalum*
 3. 叶狭矩圆形，上面全部绿色，不具网格斑..... (2) 绿叶组sect. *Emersoniana*
 2. 囊椭圆形或卵形，质地略厚，前端具较狭窄的内弯边缘（宽1—2 mm）；囊口略小于囊身..... (3) 同色组sect. *Concoloria*
 1. 唇瓣的囊盔状或拖鞋状，基部有较长的柄，前端具直生的（既不内弯也不内卷）边缘；囊口大于或等于囊身；花瓣长度超过宽度的1倍以上.....
.....2. 兜兰亚属*Paph.* subgenus *Paphiopedilum*
 4. 花序具单花或极罕2花。
 5. 叶上面全部绿色，无网格斑，偶见深绿色脉纹... (4) 兜兰组sect. *Paphiopedilum*
 5. 叶上面具明显的网格斑..... (5) 单花斑叶组sect. *Barbata*
 4. 花序具2至多花。
 6. 花依次分别展现，同一时间只有1—2花开放；花瓣大多水平伸展，线形至舌状，具长缘毛..... (7) 多花短瓣组sect. *Cochlopetalum*
 6. 花同时展现，接近同时开花；花瓣大多向下伸展，常向末端渐狭或呈匙形，不具长缘毛。
 7. 囊口两侧呈耳状；退化雄蕊倒卵形或倒心形，上面基部具1个角状或钩状突起物..... (6) 多花长瓣组sect. *Pardalopetalum*
 7. 囊口两侧不呈耳状；退化雄蕊不为倒卵形，亦非倒心形，上面不具上述突起物..... (8) 多花无耳组sect. *Coryopedilum*

Paphiopedilum is a very natural genus. Based on the structure of the lip, it can be easily divided into two distinct groups: ① Pouch subglobose, ellipsoid or ovoid, with a short claw basally and incurved or involute margins distally; its mouth is more or less smaller than the pouch, without two auricles on both sides. ② Pouch helmet-shaped or slipper-shaped, with rather long claw basally, lacking incurved or involute margins distally; its mouth is larger or as large as the pouch, sometimes auriculate on both sides. On this basis, J. T. Atwood treated the genus as containing two subgenera, *Brachypetalum* and *Paphiopedilum*, in 1984. This treatment was fundamentally followed by P. J. Cribb in 1987.

According to cytological studies by K. Karasawa (1979–1986) and Karasawa & Aoyama (1980), the basic chromosome number of *Paphiopedilum* is $2n=26$, but in some groups, such as sect. *Cochlopetalum* and sect. *Sigmatopetalum* (=sect. *Barbata*), the basic chromosome numbers range from $2n=30$ to 36 (–37?) and $2n=28$ to 44 respectively. The latter two may represent both advanced groups in the genus, and their basic chromosome numbers are considered to have derived from $2n=26$ by losing or gaining a chromosome or more chromosomes. Karasawa & Saito (1982) divided the genus into six subgenera and 13 sections, but their system has not been widely accepted except for the establishment of the

subgenus *Parvisepalum* which was recognized by some recent authors such as P. J. Cribb (1998) and Braem et al. (1998–1999).

In fact, however, there is no great difference between *Paph.* subgen. *Parvisepalum* and subgen. *Brachypetalum* morphologically. If we recognise them as two distinct subgenera, it is needed to subdivide another subgenus, *Paphiopedilum*, into more subgenera, as done by Braem et al. (1998–1999). It seems too petty and overdetailed to make so many subdivisions in such a middle-sized genus. Therefore, in the present book we recognize two subgenera, *Brachypetalum* and *Paphiopedilum*, as proposed by J. T. Atwood (1984), treating *Parvisepalum* as a section of the subgenus *Brachypetalum*. In the subgenus *Paphiopedilum*, we recognize five sections, as treated by P. J. Cribb (1998). Consequently, there are altogether two subgenera and eight sections recognized in our book.

Key to the subgenera and sections of *Paphiopedilum*

1. Pouch subglobose, ellipsoid or ovoid, with a short claw basally and incurved or involute margins apically; its mouth often smaller than the body; petals less than twice as long as broad.....**1. *Paph.* subgenus *Brachypetalum***
2. Pouch subglobose, thin-textured, with rather broad incurved or involute margins (3–4 mm wide) apically; its mouth conspicuously smaller than the body.
 3. Leaves oblong to elliptic, strongly tessellated adaxially.....**(1) sect. *Parvisepalum***
 3. Leaves narrowly oblong, uniformly green, untessellated adaxially.....
.....**(2) sect. *Emersoniana***
2. Pouch ellipsoid or ovoid, slightly thick-textured, with rather narrow incurved margins (1–2 mm wide) apically; its mouth slightly smaller than the body.....
.....**(3) sect. *Concoloria***
1. Pouch helmet-shaped or slipper-shaped, with a rather long claw basally and straight (not incurved nor involute) margins apically; its mouth larger than or as large as the body; petals over twice as long as broad.....**2. *Paph.* subgenus *Paphiopedilum***
4. Inflorescence one- or very rarely two-flowered.
 5. Leaves uniformly green, untessellated, occasionally with deep green venation adaxially.....**(4) sect. *Paphiopedilum***
 5. Leaves clearly tessellated adaxially.....**(5) sect. *Barbata***
4. Inflorescence with 2 to more flowers.
 6. Flowers produced successively, only one or two opening at a time; petals mostly horizontally spreading, linear to ligulate, long-ciliate.....**(7) sect. *Cochlopetalum***
 6. Flowers produced simultaneously, more or less opening at the same time; petals mostly downward, often long-tapering or spatulate, not long-ciliate.

7. Pouch auriculate on both sides of its mouth; staminode obovate or obcordate, with a horn-shaped or hook-shaped protuberance at adaxial base.....(6) sect. *Pardalopetalum*
7. Pouch not auriculate on both sides of its mouth; staminode not obovate nor obcordate, without a protuberance adaxially.....(8) sect. *Coryopedilum*

兜兰属中亚属、组和种的名录

A list of the subgenera, sections and species in *Paphiopedilum*

1. 宽瓣亚属

Paphiopedilum subgenus *Brachypetalum* (Hallier f.) Pfitzer in Engler, Pflanzenreich IV(50) Heft 12: 55. 1903.

Type: *Paphiopedilum concolor* (Bateman) Pfitzer

Paphiopedilum Aphanoneura *Brachypetalum* Hallier f. in Ann. Jard. Bot. Buitenzorg 14: 34. 1897.

(1) 小萼组

Paph. sect. *Parvisepalum* (Karas. & Saito) P. J. Cribb, Genus *Paphiopedilum*: 86. 1987.

Type: *Paphiopedilum delenatii* Guill.

Paphiopedilum subgenus *Parvisepalum* Karas & Saito in Bull. Hiroshima Bot. Gard. 5: 31. 1982.

1. 麻栗坡兜兰 *P. malipoense* S. C. Chen & Z. H. Tsi*
2. 硬叶兜兰 *P. micranthum* T. Tang & F. T. Wang*
3. 德氏兜兰 *P. delenatii* Guill.*
4. 越南兜兰 *P. vietnamense* Gruss & Perner
5. 杏黄兜兰 *P. armeniacum* S. C. Chen & F. Y. Liu *

(2) 绿叶组

Paph. sect. *Emersoniana* Aver. & P. J. Cribb, Slipper Orch. Vietnam 131. 2003.

Type: *Paphiopedilum emersonii* Koop. & P. J. Cribb

6. 白花兜兰 *P. emersonii* Koop. & P. J. Cribb*
7. 汉氏兜兰 *P. hangianum* Perner & Gruss*

(3) 同色组

Paph. sect. *Concoloria* (Kraenzl.) V. A. Albert & Borge Pett in Lindleyana 9 (2): 137. 1994.

Type: *Paphiopedilum concolor* (Bateman) Pfitzer

Cypripedium sect. *Concoloria* Kraenzl., Orch. Gen. Sp. 1: 13, 73. 1897.

8. 同色兜兰 *P. concolor* (Bateman) Pfitzer*

9. 巨瓣兜兰 *P. bellatulum* (Rchb. f.) Stein*
10. 文山兜兰 *P. wenshanense* Z. J. Liu & J. Yong Zhang*
11. 古德兜兰 *P. godefroyae* (God.-Leb.) Stein
12. 雪白兜兰 *P. niveum* (Rchb. f.) Stein

2. 兜兰亚属

***Paphiopedilum* subgenus *Paphiopedilum*.**

Type: *Paphiopedilum insigne* (Wall. ex Lindl.) Pfitzer

(4) 兜兰组

***Paph.* sect. *Paphiopedilum*.**

Type: *Paphiopedilum insigne* (Wall. ex Lindl.) Pfitzer

13. 带叶兜兰 *P. hirsutissimum* (Lindl. ex Hook.) Stein*
14. 红旗兜兰 *P. charlesworthii* (Rolfe) Pfitzer*
15. 波瓣兜兰 *P. insigne* (Wall. ex Lindl.) Pfitzer*
16. 小叶兜兰 *P. barbigerum* T. Tang & F. T. Wang*
17. 根茎兜兰 *P. areeanum* Gruss *
18. 天伦兜兰 *P. tranlienianum* Gruss & Perner*
19. 巧花兜兰 *P. helenae* Aver.*
20. 边远兜兰 *P. exul* (Ridl.) Kerchove
21. 亨利兜兰 *P. henryanum* Braem*
22. 格力兜兰 *P. gratixianum* (Masters) Rolfe*
23. 紫毛兜兰 *P. villosum* (Lindl.) Stein*
24. 虎斑兜兰 *P. tigrinum* Koop. & N. Haseg.*
25. 南印兜兰 *P. druryi* (Bedd.) Stein
26. 白旗兜兰 *P. spicerianum* (Rchb. f.) Pfitzer*
27. 费氏兜兰 *P. fairrieianum* (Lindl.) Stein

(5) 单花斑叶组

Paph.* sect. *Barbata (Kraenzl.) V. A. Albert & Borge Pett in *Lindleyana* 9 (2): 137. 1994.

Lectotype: *Paphiopedilum barbatum* (Lindl.) Pfitzer

Cypripedium sect. *Barbata* Kraenzl., *Orch. Gen. Sp.* 1: 53. 1897.

28. 卷萼兜兰 *P. appletonianum* (Gower) Rolfe*
29. 布玲兜兰 *P. bullenianum* (Rchb. f.) Pfitzer
30. 虎克兜兰 *P. hookerae* (Rchb. f. ex Hook. f.) Stein
31. 桑氏兜兰 *P. sangii* Braem
32. 马氏兜兰 *P. mastersianum* (Rchb. f.) Stein
33. 巴布亚兜兰 *P. papuanum* (Ridl. ex Rendle) O. Williams
34. 布干岛兜兰 *P. bougainvilleanum* Fowlie
35. 青紫兜兰 *P. violascens* Schltr.
36. 所罗门兜兰 *P. wentworthianum* Schoser & Fowlie

37. 洁净兜兰 *P. tonsum* (Rchb. f.) Stein
38. 斑瓣兜兰 *P. argus* (Rchb. f.) Stein
39. 髯毛兜兰 *P. barbatum* (Lindl.) Pfitzer
40. 胼胝兜兰 *P. callosum* (Rchb. f.) Stein
41. 朴氏兜兰 *P. potentianum* Gruss & Roeth
42. 恒氏兜兰 *P. hennisianum* (M. W. Wood) Fowlie
43. 苏吉兜兰 *P. sugiyamanum* Cavestro
44. 佛氏兜兰 *P. fowliei* Birk
45. 劳氏兜兰 *P. lawrenceanum* (Rchb. f.) Pfitzer
46. 沙巴兜兰 *P. dayanum* (Lindl.) Stein
47. 缘毛兜兰 *P. ciliolare* (Rchb. f.) Stein
48. 华丽兜兰 *P. superbiens* (Rchb. f.) Stein
49. 尖齿兜兰 *P. acmodontum* Schoser ex M. W. Wood
50. 爪哇兜兰 *P. javanicum* (Reinw. ex Lindl.) Pfitzer
51. 帕氏兜兰 *P. parnatanum* Cavestro
52. 休氏兜兰 *P. schoseri* Braem & H. Mohr
53. 民岛兜兰 *P. urbanianum* Fowlie
54. 紫纹兜兰 *P. purpuratum* (Lindl.) Stein*
55. 苏氏兜兰 *P. sukhakulii* Schoser & Senghas
56. 彩云兜兰 *P. wardii* Summerh.*
57. 秀丽兜兰 *P. venustum* (Wall. ex Sims) Pfitzer*

(6) 多花长瓣组

Paph. sect. *Pardalopetalum* Hallier f. & Pfitzer in Engler, Pflanzenreich IV (50) Heft 12: 66. 1903.

Lectotype: *Paphiopedilum lowii* (Lindl.) Stein

58. 长瓣兜兰 *P. dianthum* T. Tang & F. T. Wang*
59. 飘带兜兰 *P. parishii* (Rchb. f.) Stein*
60. 楼氏兜兰 *P. lowii* (Lindl.) Stein
61. 黑氏兜兰 *P. haynaldianum* (Rchb. f.) Stein

(7) 多花短瓣组

Paph. sect. *Cochlopetalum* Haillier f. ex Pfitzer in Engler, Pflanzenreich IV (50) Heft 12: 68. 1903.

Type: *Paphiopedilum victoria-regina* (Sander) M. W. Wood

62. 苍叶兜兰 *P. glaucophyllum* J. J. Smith
63. 李氏兜兰 *P. liemianum* (Fowlie) Karas. & Saito
64. 报春兜兰 *P. primulinum* M. W. Wood & P. Taylor
65. 玛丽兜兰 *P. victoria-mariae* (Sander ex Masters) Rolfe
66. 多花兜兰 *P. victoria-regina* (Sander) M. W. Wood

(8) 多花无耳组

Paph. sect. *Coryopedilum* Pfitzer in Engler, Pflanzenreich IV (50) Heft 12: 59. 1903.

Lectotype: *Paphiopedilum glanduliferum* (Bl.) Stein

67. 菲律宾兜兰 *P. philippinense* (Rchb. f.) Stein

68. 然氏兜兰 *P. randsii* Fowlie

69. 长须兜兰 *P. sanderianum* (Rchb. f.) Stein

70. 巨叶兜兰 *P. gigantifolium* Braem, M. Baker & C. Baker

71. 柯氏兜兰 *P. kolopakingii* Fowlie

72. 斯通兜兰 *P. stonei* (Hook.) Stein

73. 苏岛兜兰 *P. intaniae* Cavestro

74. 棉岛兜兰 *P. adductum* Asher

75. 疣点兜兰 *P. glanduliferum* (Bl.) Stein

76. 皱瓣兜兰 *P. ooi* Koop.

77. 威后兜兰 *P. wilhelminiae* L. O. Williams

78. 若氏兜兰 *P. rothschildianum* (Rchb. f.) Stein

79. 曲蕊兜兰 *P. supardii* Braem & Loeb

* 中国有分布 Native in China

二、国产种类专论

Taxonomic treatment of Chinese taxa

Paphiopedilum Pfitzer, *Morph. Stud. Orchideenbl.*: 11. 1886, nom. conserv., et in Engler, *Pflanzenreich IV(50) Heft 12*: 54. 1903; Karas. & Seito in *Bull. Hiroshima Bot. Gard.* 5: 1–69. 1982; P. J. Cribb, *Gen. Paphiopedilum*: 1–222. 1987, et *Gen. Paphiopedilum* (ed. 2): 1–427. 1998; Braem, *Paphiopedilum*: 1–249. 1988; Braem, C. D. Baker & M. L. Baker, *Gen. Paphiopedilum Nat. Hist. Cult.* 1–2: 1–363. 1998–1999; S. C. Chen, *Paphiopedilum* in K. Y. Lang (ed.), *Flora Reipubl. Popul. Sin.* 17: 52–72. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, *Native Orch. China Colour*: 321–340. 1999; Aver. et al., *Slipper Orch. Vietnam*: 55–293. 2003.

Type species: *Paphiopedilum insigne* (Wall. ex Lindl.) Pfitzer.

Stimegas Rafin., *Fl. Tell.* 4: 45. 1838, nom. rej. **Type species:** *Stimegas venustum* (Wall. ex Sims) Rafin.

Cordula Rafin., *Fl. Tell.* 4: 46. 1838, nom. rej. **Type species:** *Cordula insignis* (Wall. ex Lindl.) Rafin.

地生、石上附生或树上附生草本。根状茎短或略延长，罕有具走茎。茎通常短小，包藏于二列的叶基内，罕有延长和具节。叶通常近基生，3–7（–11）枚，二列，近基部对摺，舌状、矩圆形或椭圆形，革质，先端常具3小齿，上面全部绿色或有深浅绿色相间的网格斑，下面浅绿色或有时在基部以至整个表面具紫色斑点或呈紫色。花葶近直立或外弯；花序柄与花序轴常被毛；花序具1花或有时多花；苞片对摺；花梗短；子房1室；花通常大而美观；中萼片直立或向前俯倾于唇瓣上方，常为卵形或近圆形；侧萼片合生而成合萼片；花瓣形状多种多样，从近圆形至线形并向先端渐狭，平展至下垂，有时呈螺旋状扭转，通常上面近基部被毛；唇瓣深囊状，近球形、椭圆形或卵形，或呈盔状或拖鞋状，基部具柄，有时先端边缘内弯或内卷；蕊柱短，常有柄；雄蕊2；每个花药含2团黏性的或有时多少粉状的花粉；退化雄蕊形状变化较大；柱头有柄，向下，浅3裂，表面有乳突。果实为蒴果，3棱，圆筒形至狭椭圆形。

全属约79种，主要分布于中国西南部至东南亚，有些种类到达尼泊尔、印度南部、新几内亚和所罗门群岛。中国已知产27种。

Terrestrial, lithophytic or epiphytic herbs. Rhizome short or somewhat elongate, rarely stoloniferous. Stem usually short, enclosed in distichous leaf bases, rarely elongate and noded. Leaves usually subbasal, 3–7 (–11), distichous, conduplicate toward the base, ligulate, oblong or elliptic, coriaceous, often tridenticulate at apex, uniformly green or tessellated with dark and light green adaxially, paler or sometimes spotted or flushed with purple at base or throughout abaxially. Scape suberect to arching; peduncle and rachis often hairy; inflorescence 1- or sometimes many-flowered; bracts conduplicate; pedicel short;

ovary unilocular; flowers usually large and showy; dorsal sepal erect or sometimes curved forward over the lip, usually ovate to suborbicular; lateral sepals fused to form a synsepal; petals varying in shape, suborbicular to linear-tapering, horizontally spreading to pendulous, sometimes spirally twisted, often hairy toward adaxial base; lip deeply pouched, subglobose, ellipsoid to ovoid or helmet-shaped to slipper-shaped, with a claw basally, sometimes with incurved or involute margins apically; column short, often stalked; stamens 2; each anther containing two masses of sticky or sometimes more or less powdery pollen; staminode varying in shape; stigma stalked, downward, slightly tripartite, papillose. Fruit a capsule, 3-ribbed, cylindrical to narrowly ellipsoid.

Approximately 79 species ranging mainly from southwestern China to Southeast Asia, with some species extending to Nepal, southern India, New Guinea and Solomon Islands. There are 27 species recognized in China.

兜兰属国产种类检索表

1. 唇瓣的囊近球形、椭圆形或卵形，先端具内弯或内卷的边缘；花瓣长度不足宽度的1倍。
 2. 囊近球形，长度与宽度相近，先端内弯或内卷边缘宽4—5 mm；囊口明显小于囊身。
 3. 叶上面全部绿色或极罕有模糊的深浅绿色网格斑。
 4. 中萼片白色；退化雄蕊长度明显超过宽度.....5. 白花兜兰*P. emersonii*
 4. 中萼片浅黄色；退化雄蕊长度与宽度近相等.....6. 汉氏兜兰*P. hangianum*
 3. 叶上面具明显的深浅绿色网格斑。
 5. 花苹果绿色或浅黄绿色；花萼通常长30—50 cm.....1. 麻栗坡兜兰*P. malipoense*
 5. 花绝非上述色泽；花萼通常长10—30 cm。
 6. 中萼片近白色或有时有粉红色晕；植物不具走茎.....3. 德氏兜兰*P. delenatii*
 6. 中萼片不为近白色；植物常有走茎。
 7. 萼片、花瓣和唇瓣黄色.....4. 杏黄兜兰*P. armeniacum*
 7. 萼片、花瓣和唇瓣非黄色.....2. 硬叶兜兰*P. micranthum*
 2. 囊椭圆形或卵形，长度超过宽度，先端内弯边缘宽1—2 mm；囊口稍微小于囊身。
 8. 中萼片和花瓣具1条由棕红色斑点组成的中央条纹；退化雄蕊具长1.5—2 mm的尾状尖端.....9. 文山兜兰*P. wenshanense*
 8. 中萼片与花瓣不具上述中央条纹；退化雄蕊不具上述尾状尖端。
 9. 花浅黄色至近黄色；中萼片与花瓣上具直径为0.5—1 mm的褐红色斑点.....7. 同色兜兰*P. concolor*

9. 花白色或乳白色；中萼片和花瓣上具直径为1.5—2 mm的褐红色斑点.....
8. 巨瓣兜兰 *P. bellatulum*
1. 唇瓣的囊盔状或拖鞋状，先端不具内弯或内卷边缘；花瓣长度超过宽度的1倍以上。
 10. 花序具2—6花；花瓣长度约为宽度的10倍。
 11. 子房无毛；花被在果期仍宿存.....26. 长瓣兜兰 *P. dianthum*
 11. 子房密被短柔毛；花被在受粉后脱落.....27. 飘带兜兰 *P. parishii*
10. 花序具单花，极罕2花；花瓣长度不到宽度的6倍。
 12. 叶上面具深浅绿色相间的网格斑；唇瓣在内弯的侧裂片上具疣状突起。
 13. 花瓣上面整个密生黑褐红色斑点.....24. 彩云兜兰 *P. wardii*
 13. 花瓣上面不具或只在下半部具黑褐红色小斑点或者散生少数浅黑色的疣状突起。
 14. 叶的背面具密集紫色斑点；唇瓣与退化雄蕊具绿色脉纹.....
25. 秀丽兜兰 *P. venustum*
14. 叶的背面不具或仅基部具紫斑；唇瓣与退化雄蕊不具绿色脉纹。
 15. 叶背面基部有紫色斑；花瓣近匙形；唇瓣的囊的前端有缺刻.....
22. 卷萼兜兰 *P. appletonianum*
 15. 叶背面不具紫色斑；花瓣近矩圆形；唇瓣的囊的前端无缺刻.....
23. 紫纹兜兰 *P. purpuratum*
12. 叶上面全部绿色；唇瓣在内弯的侧裂片上不具疣状突起。
 16. 叶坚挺，革质带肉质，通常长7—10（—12.5）cm；合萼片近圆形.....
16. 巧花兜兰 *P. helenae*
16. 叶近于不坚挺，亦非革质带肉质，通常长（8—）10—40 cm；合萼片卵形至椭圆形。
 17. 花在中萼片上有3条不整齐的褐红色纵带，花瓣上亦有2条类似的纵带.....
20. 虎斑兜兰 *P. tigrinum*
17. 花在中萼片与花瓣上均不具褐红色纵带。
 18. 中萼片白色，具1条褐红色中脉；退化雄蕊基部边缘内卷，貌似一对眼睛..
21. 白旗兜兰 *P. spicerianum*
18. 中萼片非上述色泽；退化雄蕊基部边缘不内卷也不呈眼睛状。
 19. 植物具长达8 cm、粗约1 cm的根状茎（或茎）....14. 根茎兜兰 *P. areeanum*
 19. 植物不具上述的根状茎（或茎）。
 20. 退化雄蕊近方形，上面基部有2个小突起；唇瓣的囊外面多少被微柔毛..
10. 带叶兜兰 *P. hirsutissimum*
20. 退化雄蕊非方形，上面基部不具2个小突起；唇瓣的囊外面无毛。
 21. 中萼片宽4.6—6.7 cm，粉红色或粉红白色，有深色脉；退化雄蕊白色.
11. 红旗兜兰 *P. charlesworthii*

21. 中萼片宽不到4.5 cm, 非上述色泽; 退化雄蕊非白色。
22. 叶长8—19 cm, 宽0.7—1.8 cm; 花瓣长3—4 cm。
23. 中萼片与花瓣上通常具褐红色大斑点; 花瓣宽1.4—1.8 cm.....
.....17. 亨利兜兰 *P. henryanum*
23. 中萼片与花瓣上不具褐红色大斑点; 花瓣宽0.7—1 cm。
24. 花瓣边缘波状; 退化雄蕊在中央或上部具1个黄色脐状突起.....
.....13. 小叶兜兰 *P. barbigerum*
24. 花瓣边缘强烈波状; 退化雄蕊在下部具1个绿色脐状突起.....
.....15. 天伦兜兰 *P. tranlienianum*
22. 叶长(15—)20—40 cm, 宽2—4 cm; 花瓣长5—6 cm。
25. 花瓣宽1.5—2 cm, 在中脉两侧的色泽相似, 上半部略宽于或近等
宽于下半部.....12. 波瓣兜兰 *P. insigne*
25. 花瓣宽2—4.5 cm, 在中脉两侧色泽不同, 上半部宽度超过下半部
宽度1倍以上。
26. 花序柄被短毛; 中萼片白色, 近基部有浅绿色或浅黄色晕; 花瓣
宽2—2.5 cm; 囊口两侧略呈耳状.....18. 格力兜兰 *P. gratixianum*
26. 花序柄被长毛; 中萼片浅绿色或浅黄色, 有一个深栗色和更深色
条纹的中央区, 有时有宽阔的白色边缘; 花瓣宽2.5—4.5 cm; 囊
口两侧明显呈耳状.....19. 紫毛兜兰 *P. villosum*

Key to the Chinese species of *Paphiopedilum*

1. Pouch subglobose, ellipsoid or ovoid, incurved- or involute-margined apically; petals less than twice as long as broad.
2. Pouch usually subglobose, nearly as long as broad, with apical incurved or involute margins 4–5 mm broad and its mouth conspicuously smaller than the body.
3. Leaves uniformly green, very rarely obscurely tessellated with dark and light green on upper surface.
 4. Dorsal sepal white; staminode conspicuously longer than broad.....5. *P. emersonii*
 4. Dorsal sepal pale yellow; staminode nearly as long as broad.....6. *P. hangianum*
3. Leaves distinctly tessellated with dark and light green on upper surface.
 5. Flowers apple-green to pale yellow-green; scape usually 30–50 cm long.....
.....1. *P. malipoense*
 5. Flowers not apple-green nor pale yellow-green; scape often 10–30 cm long.
 6. Dorsal sepal whitish or sometimes tinged with pinkish; plants not stoloniferous.....
.....3. *P. delenatii*

6. Dorsal sepal not whitish; plants often stoloniferous.
7. Sepals, petals and lip yellow.....**4. *P. armeniacum***
7. Sepals, petals and lip not yellow.....**2. *P. micranthum***
2. Lip usually ellipsoid or ovoid, longer than broad, with apical incurved margins 1–2 mm broad and its mouth slightly smaller than the body.
8. Dorsal sepal and petals with a central stripe composed of brown-red spots; staminode with a caudate apex 1.5–2 mm long.....**9. *P. wenshanense***
8. Dorsal sepal and petals without a central stripe as above; staminode without a caudate apex as above.
9. Flower pale yellow to yellowish, with maroon spots 0.5–1 mm in diam. on dorsal sepal and petals**7. *P. concolor***
9. Flower white to ivory, with maroon spots 1.5–2 mm in diam. on dorsal sepal and petals.....**8. *P. bellatulum***
1. Lip helmet-shaped or slipper-shaped, lacking incurved or involute margins apically; petals over twice as long as broad.
10. Inflorescence with 2–6 flowers; petals about ten times longer than broad.
11. Ovary glabrous; perianth persistent until fruiting.....**26. *P. dianthum***
11. Ovary densely pubescent; perianth dropping off on pollination.....**27. *P. parishii***
10. Inflorescence with 1 or very rarely 2 flowers; petals less than six times longer than broad.
12. Leaves tessellated with dark and light green on upper surface; lip warted on the incurved side-lobes.
13. Petals heavily spotted with blackish-maroon over whole upper surface...**24. *P. wardii***
13. Petals without or sometimes with blackish-maroon spots in basal half or a few blackish warts scatteredly.
14. Leaves densely spotted with purple on whole lower surface; lip and staminode distinctly green-veined.....**25. *P. venustum***
14. Leaves not or marked with purple at base on lower surface; lip and staminode not green-veined.
15. Leaves marked with purple at abaxial base; petals spatulate; pouch notched-margined apically.....**22. *P. appletonianum***
15. Leaves not marked with purple on lower surface; petals suboblong; pouch entire-margined apically.....**23. *P. purpuratum***
12. Leaves uniformly green on upper surface; lip not warted on the incurved side-lobes.
16. Leaves rigid, coriaceous-succulent, usually 7–10(–12.5) cm long; synsepal suborbicular**16. *P. helenae***
16. Leaves scarcely rigid, not coriaceous-succulent, usually (8–)10–40 cm long;

synsepal ovate to elliptic.

17. Flower with three irregular longitudinal maroon bars on dorsal sepal and two similar bars on petals.....**20. *P. tigrinum***
17. Flower lacking maroon bars on either dorsal sepal or petals.
18. Dorsal sepal white with a maroon midvein; staminode with involute basal margins looking like a pair of eyes.....**21. *P. spicerianum***
18. Dorsal sepal not colored as above; staminode lacking involute basal margins as above.
19. Plant with a rhizome (or stem) over 8 cm long and 1 cm in diam.....
.....**14. *P. areeanum***
19. Plant lacking a rhizome (or stem) as above.
20. Staminode subsquare, with two small protuberances toward adaxial base; pouch more or less puberulous on outer surface.....**10. *P. hirsutissimum***
20. Staminode not subsquare, lacking two small protuberances toward adaxial base; pouch glabrous on outer surface.
21. Dorsal sepal 4.6–6.7 cm wide, pink or pink-whitish, with deep-colored veins; staminode white.....**11. *P. charlesworthii***
21. Dorsal sepal less than 4.5 cm wide, not colored as above; staminode not white.
22. Leaves 8–19 cm long, 0.7–1.8 cm wide; petals 3–4 cm long.
23. Dorsal sepal and petals often with large maroon spots; petals 1.4–1.8 cm wide.....**17. *P. henryanum***
23. Dorsal sepal and petals lacking large maroon spots; petals 0.7–1 cm wide.
24. Petals undulate-margined; staminode with a yellow umbo in central or upper part.....**13. *P. barbigerum***
24. Petals strongly undulate-margined; staminode with a green umbo in lower part.....**15. *P. tranlienianum***
22. Leaves (15–) 20–40 cm long, 2–4 cm wide; petals 5–6 cm long.
25. Petals 1.5–2 cm wide, both sides of the midvein similar in color, apical half slightly broader than or nearly as broad as basal half.....
.....**12. *P. insigne***
25. Petals 2–4.5 cm wide, both sides of the midvein different in color, apical half over twice broader than basal half.
26. Peduncle covered with short hairs; dorsal sepal white, often tinged with pale green to pale yellow toward its base; petals 2–2.5 cm wide; pouch often slightly auriculate on both sides of its mouth.....

-**18. *P. gratixianum***
26. Peduncle covered with long hairs; dorsal sepal pale green to pale yellow, with a deep maroon and deeper-striped central area, sometimes broadly white-margined; petals 2.5–4.5 cm wide; pouch conspicuously auriculate on both sides of its mouth.....**19. *P. villosum***

1. 麻栗坡兜兰

Paphiopedilum malipoense S. C. Chen & Z. H. Tsi in Acta Phytotax. Sin. 22 (2): 119. 1984; P. J. Cribb, Gen. Paphiopedilum: 90. 1987, et Gen. Paphiopedilum (ed. 2): 82. 1998; F. Mark in Orchid Digest 51: 66. 1987; Braem, Paphiopedilum: 37. 1988; Z. H. Tsi, S. C. Chen & K. Mori, Wild Orch. China; 24. 1997; S. C. Chen & Z. H. Tsi, Orch. China: 123. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 80. 1998; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 334. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 54. 1999; Aver. et al., Slipper Orch. Vietnam: 104. 2003. **Type:** China, Yunnan, Malipo, cult., K. M. Feng 13161 (holotype, PE!).

麻栗坡兜兰是一个变异性甚大的种。总共有4个变种（见下文）和3个变型已被描述。3个变型是：同色变型（f. *concolor* Braem）（1998）、通氏变型（f. *tonnianum* Roeth）（2000）和纯绿变型（f. *virescens* Gruss & Roeth）（2001）。此外，此种与硬叶兜兰（*P. micranthum*）之间的天然杂种：美花兜兰（杂种）（*Paphiopedilum* × *fanaticum* Koop. & N. Haseg.）（in Orchid Advocate 18: 50. 1992）原产中国。

This is a highly variable species. There are altogether four varieties (see below) and three forms known to us. The three forms are: f. *concolor* Braem (1998), f. *tonnianum* Roeth (2000) and f. *virescens* Gruss & Roeth (2001). In addition, *Paphiopedilum* × *fanaticum* Koop. & N. Haseg. (in Orchid Advocate 18: 50. 1992), a natural hybrid of this species and *P. micranthum*, was described from China.

变种检索表

1. 叶背面布满紫色斑点；退化雄蕊前半部深紫色或黑紫色.....
.....**1a. 麻栗坡兜兰**（原变种）*P. malipoense* var. *malipoense*
1. 叶背不具或疏生紫色斑点；退化雄蕊前半部浅绿色至近白色并具紫红色细脉纹。
 2. 花瓣宽2.5—4 cm；唇瓣近球形，宽3—4 cm.....
.....**1b. 浅斑兜兰**（变种）*P. malipoense* var. *jackii*
 2. 花瓣宽1—2.5 cm；唇瓣非球形，宽1—3 cm。
 3. 根密被短柔毛；花瓣宽1.5—2.5 cm；唇瓣的囊具钩状顶端；退化雄蕊宽1—1.3 cm
.....**1c. 钩唇兜兰**（变种）*P. malipoense* var. *hiepii*
 3. 根疏被短柔毛或变无毛；花瓣宽6—7 mm；唇瓣的囊顶端近截形；退化雄蕊宽4—5 mm.....**1d. 窄瓣兜兰**（变种）*P. malipoense* var. *angustatum*

Key to the varieties

1. Leaves heavily spotted with purple abaxially; staminode deep purple to blackish-purple in apical half.....**1a. *P. malipoense* var. *malipoense***
1. Leaves not or sparsely spotted with purple abaxially; staminode pale green to whitish and finely striped or veined with purple-red in apical half.
 2. Petals 2.5–4 cm wide; lip subglobose, 3–4 cm wide.....**1b. *P. malipoense* var. *jackii***
 2. Petals 1–2.5 cm wide; lip not globose, 1–3 cm wide.
 3. Roots densely pubescent; petals 1.5–2.5 cm wide; pouch hooked at apex; staminode 1–1.3 cm wide.....**1c. *P. malipoense* var. *hiepii***
 3. Roots sparsely pubescent or glabrescent; petals 6–7 mm wide; pouch subtruncate at apex; staminode 4–5 mm wide.....**1d. *P. malipoense* var. *angustatum***

1a. 麻栗坡兜兰 (原变种) (图5-1, 2, 3; 图版1) (Fig. 5-1, 2, 3; Pl. 1)

Paphiopedilum malipoense* var. *malipoense

地生植物，具短的根状茎。叶二列，4–8枚，矩圆形或狭椭圆形，革质，长7–18 (–23) cm，宽2.5–6 (–7) cm，先端急尖或斜急尖，上面有深浅绿色相间的网格斑，背面布满紫色斑点，中脉在背面呈龙骨状突起，近叶面先端具金黄色的鸟足状斑纹，近基部边缘具缘毛。花葶近直立，长30–65 cm，紫色或淡绿色而具密集紫色斑点，被白色长柔毛；苞片狭卵状披针形，对摺，长1.5–2.5 cm，浅绿色并具紫色斑点，背面被白色长柔毛，边缘有缘毛；花梗和子房长4–6.5 cm，具白色长柔毛；花通常单朵，直径7–11 cm，稍有香气；中萼片、合萼片和花瓣苹果绿或极罕浅黄绿色，有褐紫色条纹或多少由斑点组成的条纹；唇瓣浅黄绿色或罕有呈乳白的绿色，内表面有不甚明显的褐紫色斑点；退化雄蕊白色，前半部深紫色至黑紫色；中萼片卵状披针形至椭圆状披针形，长4–6 (–7) cm，宽2–4 cm，先端渐尖，边缘有缘毛，上面被微柔毛，背面具白色长柔毛；合萼片与中萼片相似，稍短而宽；花瓣卵形或近椭圆形，长4–6 (–7) cm，宽3–5 cm，先端急尖或钝，两面均被微柔毛，上面基部有白色长柔毛，边缘具缘毛；唇瓣深囊状，近球形，表面密被白色短柔毛，长4–6 cm，宽4–5.5 cm，先端边缘内卷，囊底有白色长柔毛；退化雄蕊矩圆状卵形至宽卵形，长1.3–1.4 cm，宽1.2–1.3 cm，先端截形，基部近无柄，基部边缘有细缘毛，背面有龙骨状突起。2n=26。

花期：野外为(9–)1–4月。

分布：重庆南部、广西西南部、贵州西南部、云南东南部；越南北部。

生境：生于石灰岩山地杂草丛生的山坡或林下和灌丛下腐殖质丰富的泥土中；海拔800–1600 m。

Terrestrial plants, with a short rhizome. Leaves 4–8, distichous, coriaceous, oblong or

narrowly elliptic, 7–18 (–23) cm long, 2.5–6 (–7) cm wide, acute or oblique-acute at apex, adaxially tessellated with dark and light green, abaxially heavily spotted with purple and carinate, marked with golden pedate stripes toward adaxial apex, ciliate toward the base. Scape suberect, 30–65 cm long, purple or pale green densely spotted with purple, white-villose; bract narrowly ovate-lanceolate, conduplicate, 1.5–2.5 cm long, pale green spotted with purple, white-villose abaxially, ciliate; pedicel and ovary 4–6.5 cm long, white-villose; flower often single, 7–11 cm across, slightly scented; dorsal sepal, synsepal and petals apple-green or very rarely pale yellow-green striped or striped-spotted with pale brown-purple; lip pale yellow-green or rarely whitish-green obscurely spotted with pale brown-purple on inner surface; staminode white, deep purple to blackish-purple in apical half; dorsal sepal ovate-lanceolate or elliptic-lanceolate, 4–6 (–7) cm long, 2–4 cm wide, acuminate at apex, ciliate, adaxially puberulous, abaxially white-villose; synsepal similar to dorsal sepal, slightly shorter and broader; petals ovate or subelliptic, 4–6 (–7) cm long, 3–5 cm wide, acute or obtuse at apex, sparsely puberulous on both surfaces, white-villose toward adaxial base, ciliate; lip deep-pouched, subglobose, 4–6 cm long, 4–5.5 cm wide, with involute margins apically, white-villose at inner bottom; staminode oblong-ovate to broadly ovate, 1.3–1.4 cm long, 1.2–1.3 cm wide, truncate at apex, subsessile, minutely ciliate on basal margins, carinate abaxially. $2n=26$.

Flowering period: (September-) January to April in the wild.

Distribution: S Chongqing, SW Guangxi, SW Guizhou, SE Yunnan; N Vietnam.

Habitat: On glassy slopes or in humus-rich soil in forests and thickets in limestone mountainous regions at an elevation between 800 and 1600 m.

1b. 浅斑兜兰 (变种) (图5-4, 5) (Fig. 5-4, 5)

Paphiopedilum malipoense* var. *jackii (S. Hua Hu) Aver. in *Orchids* 66 (2): 153. 1997; P. J. Cribb, *Gen. Paphiopedilum* (ed. 2): 88. 1998; Z. J. Liu et al. in *Acta Bot. Yunnan.* 24 (2): 196. 2002; Aver. et al., *Slipper Orch. Vietnam*: 113. 2003. **Type:** China, Yunnan, Malipo, cult., S. Hua Hu 3268 A-S (holotype, IBSC).

Paphiopedilum jackii S. Hua Hu in *Die Orchidee* 46 (3): 114. 1996.

与原变种极相似，但叶的背面通常仅有较疏而色淡的紫色斑点；退化雄蕊前部浅绿色至白色并具紫红色脉纹而无深紫色或黑紫色斑块，可以区别。 $2n=26$ 。

花期：野外为2–3月。

分布：云南东南部（麻栗坡县）；越南北部。

生境：石灰岩山地林下多石与排水良好之地；海拔600–2000 m。

说明：此种的模式标本系广西人赵木华赠送给新种作者胡松华的，据采集人说原标本系采自麻栗坡。新种作者应为Hu Song Hua，而非Hua Hu Song，因外国人常把姓置于后面，故误为H. S. Hua，应改正为S. Hua Hu。

The leaves of this variety are not or sparsely spotted or marked with purple abaxially, and the staminode pale green to whitish and finely striped or veined with purple-red in apical half. By these features it is easily distinguishable from the typical one, *P. malipoense* var. *malipoense*. $2n=26$.

Flowering period: February and March in the wild.

Distribution: SE Yunnan (Malipo county); N Vietnam.

Habitat: In rocky and well-drained places in forests on limestone mountains at an elevation of 600–2000 m.

Note: This taxon was published by Mr. Hu Song Hua (S. Hua Hu, not H. S. Hua) based on a plant sent by Zhao (Chao) Mu-hua (M. H. Zhao). Zhao told us that the plant was collected from Malipo county of southeastern Yunnan.

1c. 钩唇兜兰 (变种) (图5-6, 7) (Fig. 5-6, 7)

***Paphiopedilum malipoense* var. *hiepii* (Aver.) P. J. Cribb, Gen. Paphiopedilum (ed. 2): 88, 1998; Z. J. Liu et al. in Acta Bot. Yunnan. 24 (2): 196. 2002; Aver. et al., Slipper Orch. Vietnam: 115. 2003. Type:** Northern Vietnam, Tuyen Quang prov., N. T. Hiep s. n. (holotype, LE).

Paphiopedilum hiepii Aver. in Orchids 67 (3): 261. 1998.

Paphiopedilum jackii S. Hua Hu var. *hiepii* (Aver.) Koop. in Orchid Digest 64 (4): 168. 2000.

此变种具密生短柔毛的根；叶背面稍具紫色斑；唇瓣小，宽1.5–2.5 cm，前端呈钩状；花瓣狭窄，宽1.5–2.5 cm；退化雄蕊近卵形，宽10–13 mm，前半部浅绿色至白色并具紫红色细脉纹。上述特征易于区别于原变种（*P. malipoense* var. *malipoense*）与浅斑兜兰（变种）（*P. malipoense* var. *jackii*）。此外，此变种囊的钩状先端不具内折的边缘，似乎并非稳定的性状。有必要做进一步的研究。

花期：野外为3–4月。

分布：云南东南部（麻栗坡县）；越南北部。

生境：生于石灰岩地区林下或灌丛下多石之地；海拔500–1500 m。

This variety is characterized by having densely pubescent roots, weekly purple-marked on the abaxial surface of the leaves, small lip 1.5–2.5 cm wide and hooked at apex, narrower petals 1.5–2.5 cm wide and subovate staminode 10–13 mm wide and its apical half pale green to whitish and finely striped or veined with purple-red. By these features this variety is very clearly distinguished from *P. malipoense* var. *malipoense* and *P. malipoense* var. *jackii*. In addition, the hooked apex of the pouch in this variety often lacks an incurved margin; this seems to be an unstable feature. A further investigation is needed.

Flowering period: March and April in the wild.

Distribution: SE Yunnan (Malipo county); N Vietnam.

Habitat: In rocky places in forests or thickets in limestone areas at an elevation between 500 and 1500 m.

1d. 窄瓣兜兰 (变种) (图5-8, 9) (Fig. 5-8, 9)

Paphiopedilum malipoense* var. *angustatum (Z. J. Liu & S. C. Chen) Z. J. Liu & S. C. Chen in Acta Bot. Yunnan. 24 (2): 196. 2002. **Type:** China, Yunnan, Malipo, cult., Z. J. Liu 1505 (holotype, NOCC*!).

Paphiopedilum angustatum Z. J. Liu & S. C. Chen in Acta Phytotax. Sin. 38 (5): 464. 2000.

此变种与钩唇兜兰 (变种) (*P. malipoense* var. *hiepii*) 相近, 区别点在于此变种的根具微柔毛或变无毛; 花常2朵; 唇瓣较小, 宽约1 cm, 顶端不呈钩状; 花瓣狭窄, 宽6–7 mm; 退化雄蕊近矩圆形, 宽4–5 mm, 前半部浅绿色至近白色并具紫红色细脉纹。上述特征也可以用以区别该种的其他2个变种。

花期: 野外为2–3月。

分布: 云南东南部 (麻栗坡县)。

生境: 生于石灰岩山坡的阔叶林下。

This variety is similar to *P. malipoense* var. *hiepii*, from which it differs by having puberulous or glabrescent roots, often two flowers with smaller lip ca. 1 cm wide and not hooked at apex, narrow petals 6–7 mm wide, and suboblong staminode 4–5 mm wide and its apical half pale green to whitish and finely striped or veined with purple-red. These characteristics can be used to distinguish this variety from two other varieties of the same species.

Flowering period: February and March in the wild.

Distribution: NE Yunnan (Malipo county).

Habitat: In broad-leaved forests on limestone slopes.

* NOCC (Herbarium, The National Orchid Conservation Center of China) was called SZWN (Herbarium, Shenzhen Wutongshan Nurseries) formerly.

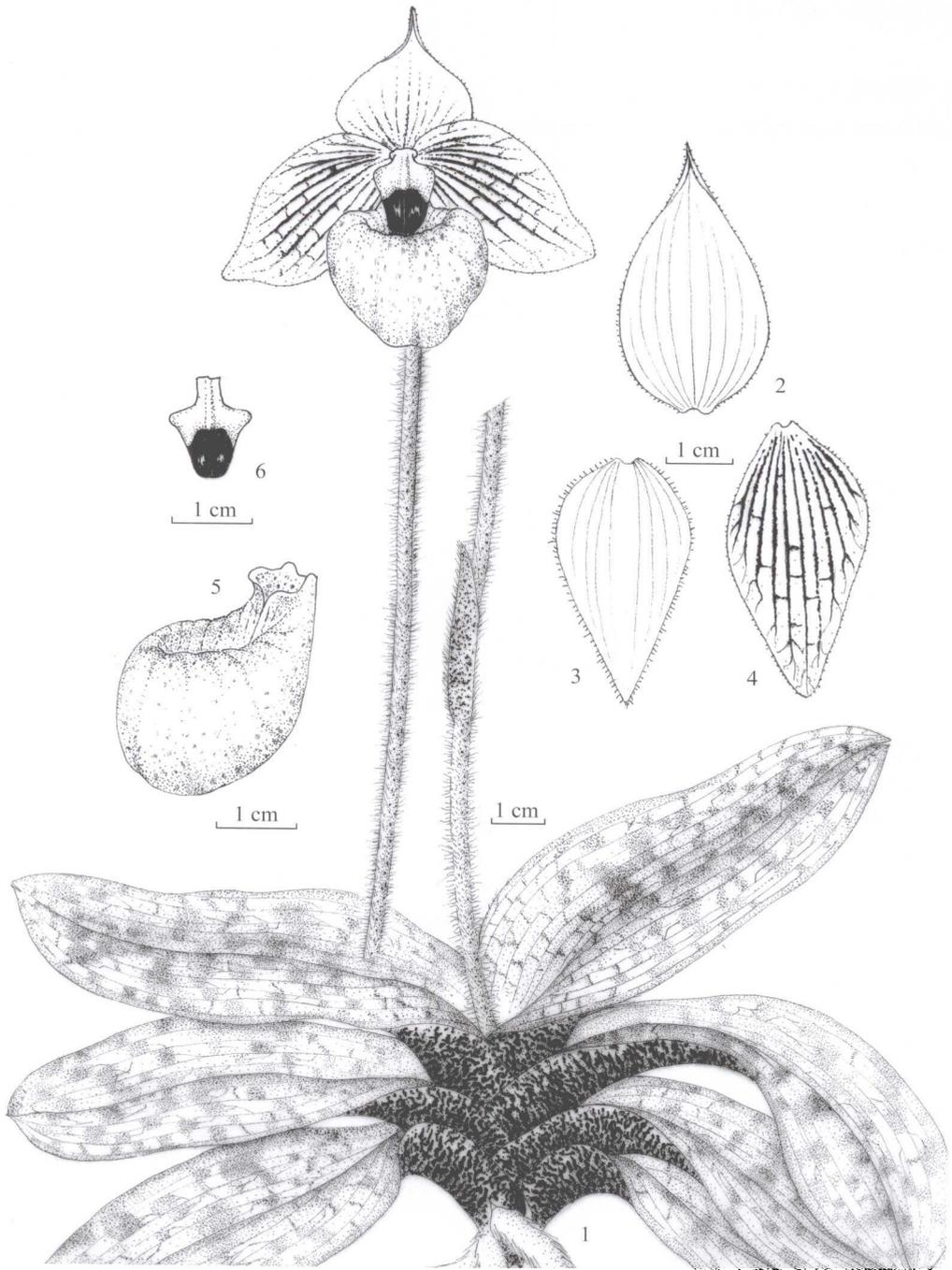


图 5-1. 麻栗坡兜兰 (原变种): 1. 带花植株; 2. 中萼片; 3. 合萼片; 4. 花瓣; 5. 唇瓣, 侧面观; 6. 退化雄蕊

Fig. 5-1. *Paphiopedilum malipoense* var. *malipoense*: 1. Flowering plant; 2. Dorsal sepal; 3. Synsepal; 4. Petal; 5. Lip, side view; 6. Staminode



图 5-2. 麻栗坡兜兰（原变种）：a. 在云南东南部的自然生境；b. 在云南东南部野外开花
Fig. 5-2. *Paphiopedilum malipoense* var. *malipoense*: a. Its natural habitat in Southeast Yunnan;
b. Flowering in the wild in Southeast Yunnan



图 5-3. 麻栗坡兜兰（原变种）：a. 在广西西部野外开花；b. 叶的先端部分，示其上的金黄色鸟足状斑纹；c. 在栽培中开花

Fig. 5-3. *Paphiopedilum malipoense* var. *malipoense*: a. Flowering in the wild in western Guangxi; b. Apical part of a leaf, showing golden pedate stripes on it; c. Flowering in cultivation



图版 1. 麻栗坡兜兰 (原变种)
Plate 1. *Paphiopedilum malipoense* var. *malipoense*

水彩画 作者: 吴俊强
Water color painting by Jun -qiang Wu

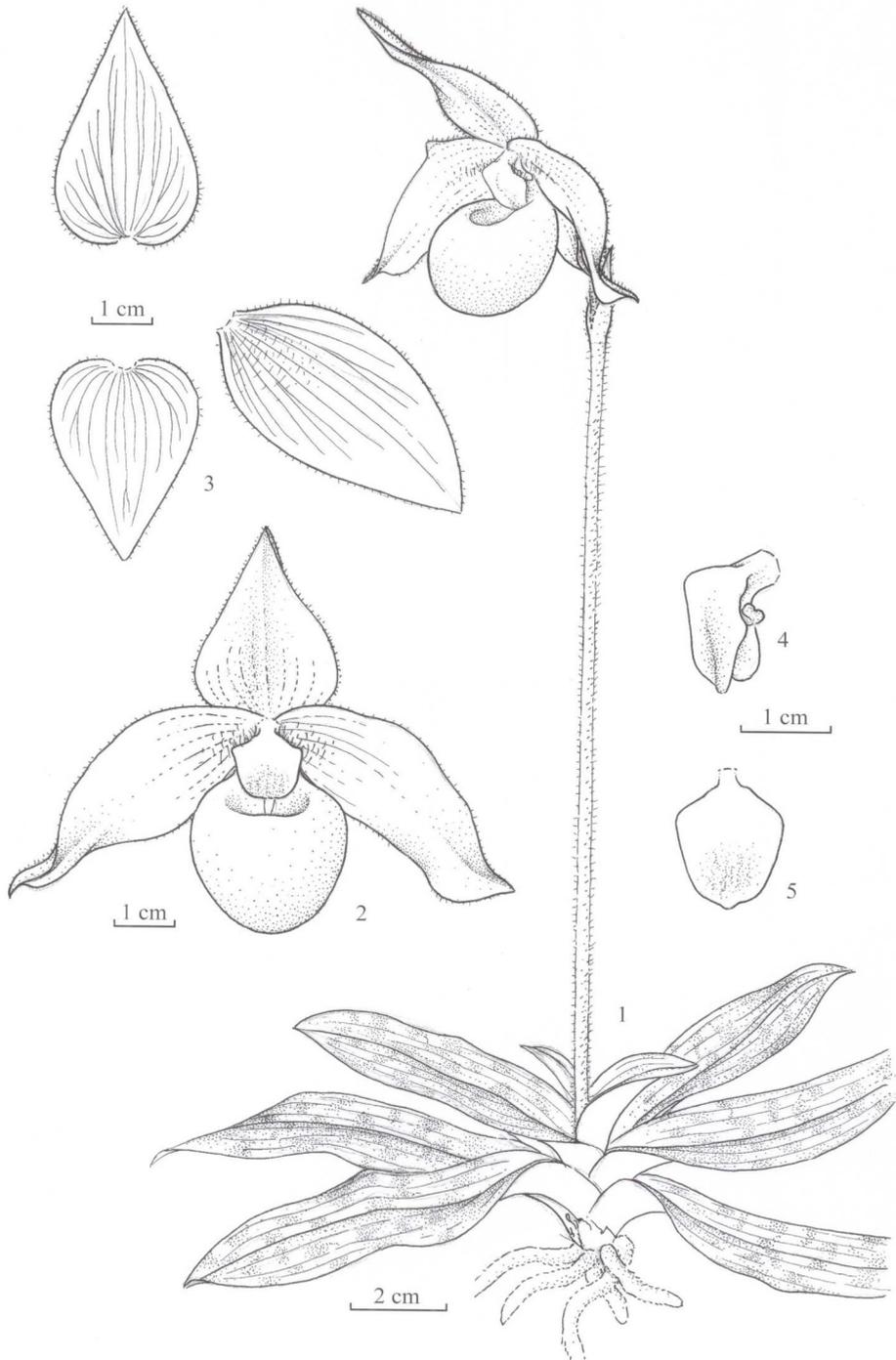


图 5-4. 浅斑兜兰 (变种): 1. 带花植株; 2. 花; 3. 中萼片、合萼片与花瓣; 4. 蕊柱; 5. 退化雄蕊
Fig. 5-4. *Paphiopedilum malipoense* var. *jackii*: 1. Flowering plant; 2. Flower; 3. Dorsal sepal, synsepal and petal; 4. Column; 5. Staminode



图 5-5. 浅斑兜兰（变种）：a. 在云南东南部自然生境中开花；b-d. 在栽培中开花
Fig. 5-5. *Paphiopedilum malipoense* var. *jackii*: a. Flowering in its natural habitat in Southeast Yunnan; b-d. Flowering in cultivation

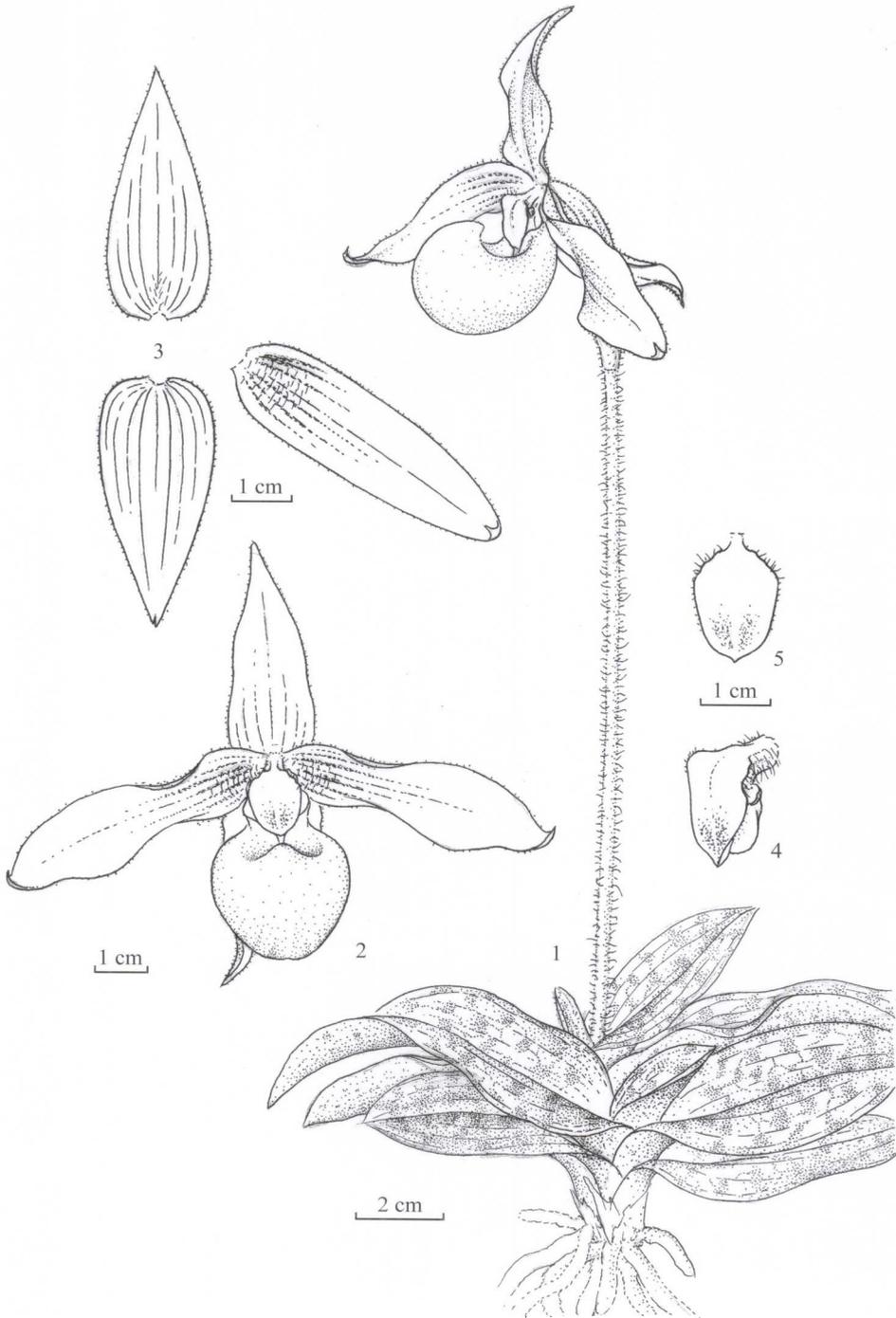


图 5-6. 钩唇兜兰 (变种): 1. 带花植株; 2. 花; 3. 中萼片、合萼片与花瓣; 4. 蕊柱; 5. 退化雄蕊
Fig. 5-6. *Paphiopedilum malipoense* var. *hiepii*: 1. Flowering plant; 2. Flower; 3. Dorsal sepal, synsepal and petal; 4. Column; 5. Staminode

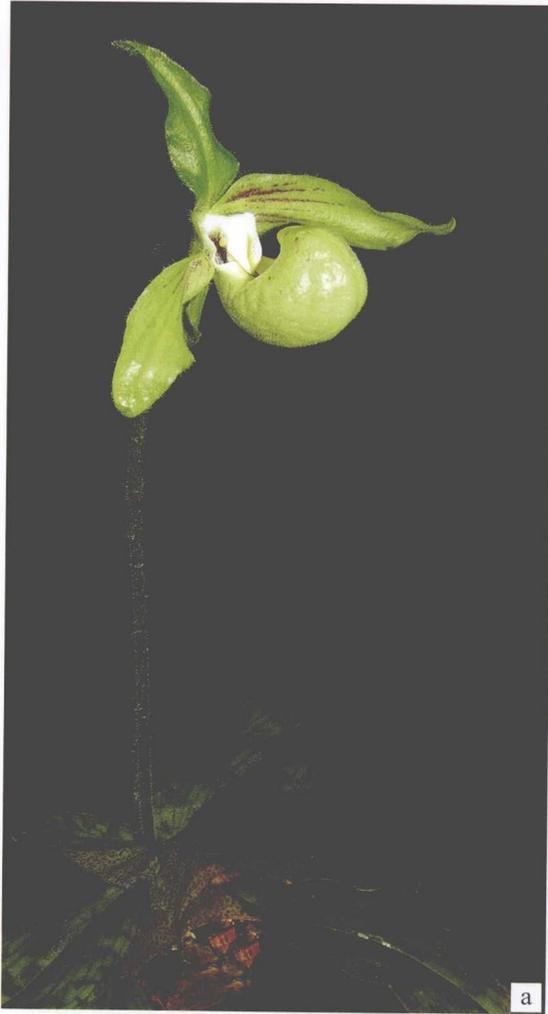


图 5-7. 钩唇兜兰 (变种): a, b. 在栽培中开花
Fig. 5-7. *Paphiopedilum malipoense* var. *hiepii*:
a, b. Flowering in cultivation

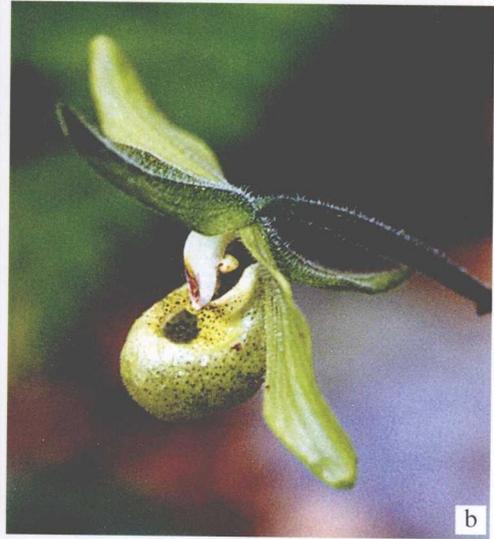


图 5-8. 窄瓣兜兰 (变种): a-c. 在栽培中开花
Fig. 5-8. *Paphiopedilum malipoense* var.
angustatum: a-c. Flowering in cultivation

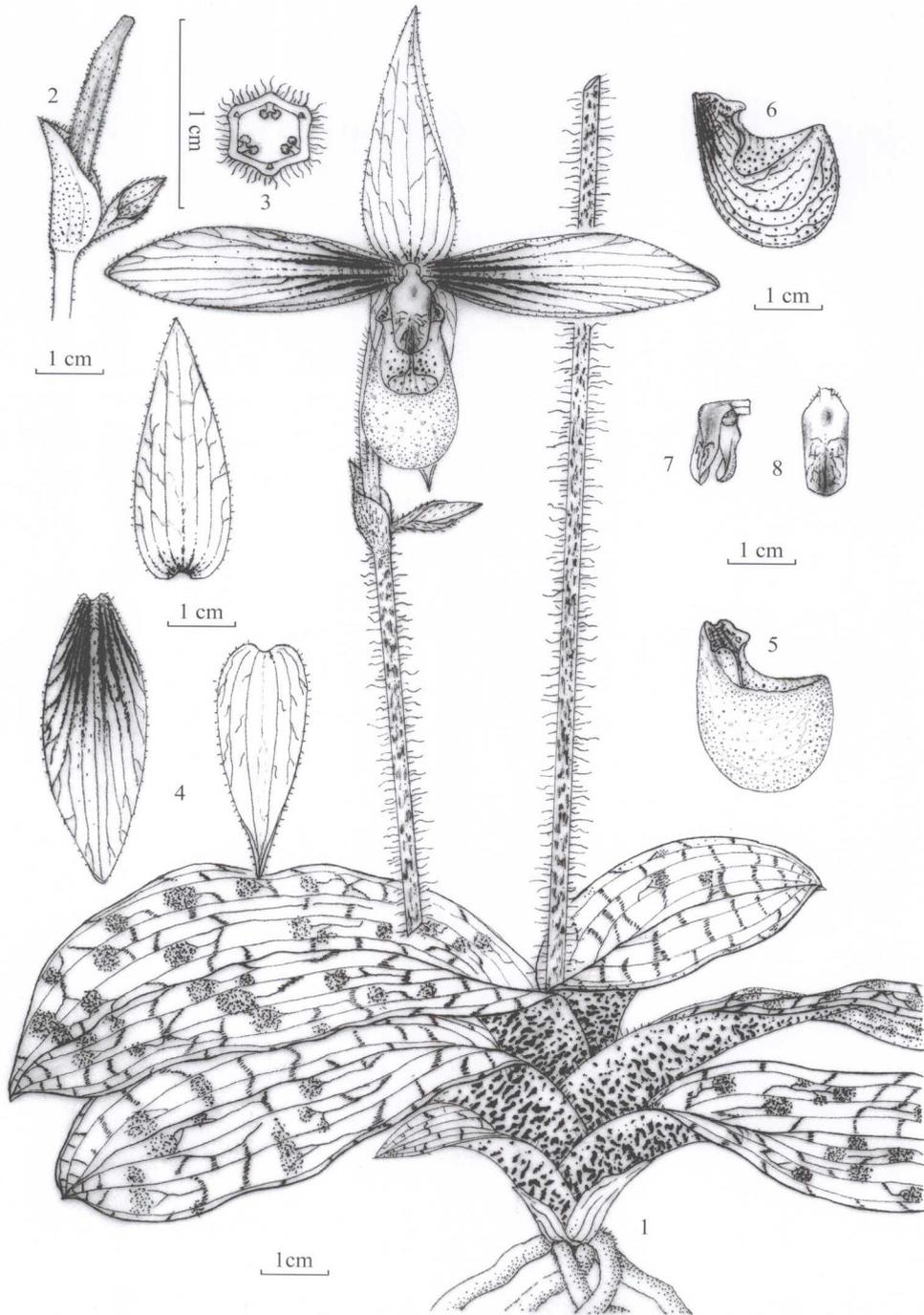


图 5-9. 窄瓣兜兰 (变种): 1. 带花植株; 2. 苞片、子房和花蕾; 3. 子房横切面; 4. 中萼片、花瓣与合萼片; 5. 唇瓣, 侧面观; 6. 唇瓣, 纵切面; 7. 蕊柱; 8. 退化雄蕊
 Fig. 5-9. *Paphiopedilum malipoense* var. *angustatum*: 1. Flowering plant; 2. Bract, ovary and bud; 3. Ovary, cross section; 4. Dorsal sepal, petal and synsepal; 5. Lip, side view; 6. Lip, longitudinal section; 7. Column; 8. Staminode

2. 硬叶兜兰 (图5-10, 11, 12; 图版2, 3) (Fig. 5-10, 11, 12; Pl. 2, 3)

Paphiopedilum micranthum T. Tang & F. T. Wang in Acta Phytotax. 1 (1): 56. 1951; S. C. Chen & F. Y. Liu in Acta Bot. Yunnan. 4 (2): 165. 1982; P. J. Cribb, Gen. Paphiopedilum: 93. 1987, et Gen. Paphiopedilum (ed. 2): 91. 1998; Braem, Paphiopedilum: 40. 1988; Fowlie in Orchid Digest 53: 132. 1989; Z. H. Tsi, S. C. Chen & K. Mori, Wild Orch. China: 24. 1997; S. C. Chen & Z. H. Tsi, Orch. China: 123. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 90. 1998; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 336. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Republ. Popul. Sin. 17: 57. 1999; Aver. et al., Slipper Orch. Vietnam: 120. 2003. **Type:** China, Yunnan, C. W. Wang 86182 (holotype, PE!).

Paphiopedilum globulosum Z. J. Liu & S. C. Chen in Acta Phytotax. Sin. 40 (4): 365. 2002.

Type: China, Yunnan, Wenshan, cult. Z. J. Liu 21052 (holotype, PE!; isotype, NOCC!).

Paphiopedilum micranthum var. *oblatum* Z. J. Liu & J. Yong Zhang in Acta Phytotax. Sin. 40 (4): 366. 2002. **Type:** China, Yunnan, Wenshan, cult., Z. J. Liu 21053 (holotype, NOCC!).

地生植物，在不利环境中地下常具数条至多条横走的走茎；走茎长达10 cm，直径1.5—2.5 mm。叶3—5枚，二列，厚革质，矩圆形或狭椭圆形，长6—14 cm，宽1.5—2.5 (—3) cm，先端急尖或钝，上面有深浅绿色相间的网格斑，背面有密集的紫色斑点并具龙骨状突起，近叶面先端具金黄色的鸟足状斑纹，近基部具长缘毛。花葶直立，长10—30 cm，紫褐色，被白色长柔毛；苞片卵形，长1.2—1.8 cm，背面疏被长柔毛；花梗和子房长3.5—6 cm，被白色长柔毛；花大，艳丽；中萼片与花瓣通常浅黄色至乳白色而有紫红色粗脉纹；唇瓣白色至略带粉红色；退化雄蕊白色，有浅紫红色斑点和短条纹，在上半部有1个黄色斑块；中萼片卵形或宽卵形，长1.5—2.5 (—3.2) cm，宽1.8—2.5 cm，先端急尖，背面被白色长柔毛；合萼片与中萼片相似或有时略小，背面具2条稍钝的龙骨状突起；花瓣宽卵形至近圆形，长2—4 cm，宽2.8—4 cm，先端钝或浑圆，上面基部具白色长柔毛，背面多少被短柔毛；唇瓣深囊状，椭圆状球形至近球形，长5—10 cm，宽4.5—5.5 cm，先端边缘内卷；退化雄蕊椭圆形，纵向对摺，长1.4—1.6 cm，宽1—1.3 cm，先端急尖。2n=26。

花期：野外为3—5月。

分布：重庆南部、广西西部至北部、贵州东北部至西南部、湖南西南部、云南东南部；越南北部。

生境：生于石灰岩地区多石与灌木丛生之地或林下岩石缝隙中；海拔400—1700 m。

说明：在此种的种下分类群中，由Fowlie (1989b, 1993) 发表的中国广西植物：subsp. *marginatum*、subsp. *eburneum* 和 subsp. *extendatum* 均为不合格名称。此外有2个变型可被承认：白黄变型 f. *alboflavum* (Braem) Braem (1998) 和格蓝变型 f. *glanzeanum* (Gruss & Roeth) Gruss (1999)。

Terrestrial plants, in an unfavorable environment often with several to many creeping

stolons to 10 cm long and 1.5–2.5 mm thick. Leaves 3–5, distichous, thick-coriaceous, oblong to narrowly elliptic, 6–14 cm long, 1.5–2.5(–3) cm wide, acute or obtuse at apex, adaxially tessellated with dark and light green, abaxially densely purple-spotted and carinate, marked with golden pedate stripes toward adaxial apex, long-ciliate toward the base. Scape erect, 10–30 cm long, purple-brown, white-villose; bract ovate, 1.2–1.8 cm long, sparsely villose on abaxial surface; pedicel and ovary 3.5–6 cm long, white-villose; flower large, showy; dorsal sepal and petals pale yellow to whitish, thickly veined with red-purple; lip white to pinkish; staminode white with pale purple-red spots and dashes adaxially and a yellow flush in apical half; dorsal sepal ovate or broadly ovate, 1.5–2.5 (–3.2) cm long, 1.8–2.5 cm wide, acute at apex, white-villose abaxially; synsepal similar to dorsal sepal or sometimes slightly smaller, obtusely bicarinate abaxially; petals broadly ovate to suborbicular, 2–4 cm long, 2.8–4 cm wide, obtuse-rounded at apex, slightly puberulous abaxially, white-villose toward adaxial base; lip deep pouched, ellipsoid-globose to subglobose, 5–10 cm long, 4.5–5.5 cm wide, with involute margins apically; staminode elliptic, longitudinally conduplicate, 1.4–1.6 cm long, 1–1.3 cm wide, acute at apex. $2n=26$.

Flowering period: March to May in the wild.

Distribution: S Chongqing, N & W Guangxi, NE to SW Guizhou, SW Hunan, SE Yunnan; N Vietnam.

Habitat: In rocky and bushy places or crevices of rocks in forests in limestone areas at an elevation between 400 and 1700 m.

Note: Among the infraspecific taxa of this species, three subspecies (subsp. *marginatum*, subsp. *eburneum* and subsp. *extendatum*) described by Fowlie (1989, 1993) from Guangxi are all invalid names, but two forms by others can be recognized: f. *alboflavum* (Braem) Braem (1998) and f. *glanzeanum* (Gruss & Roeth) Gruss (1999).

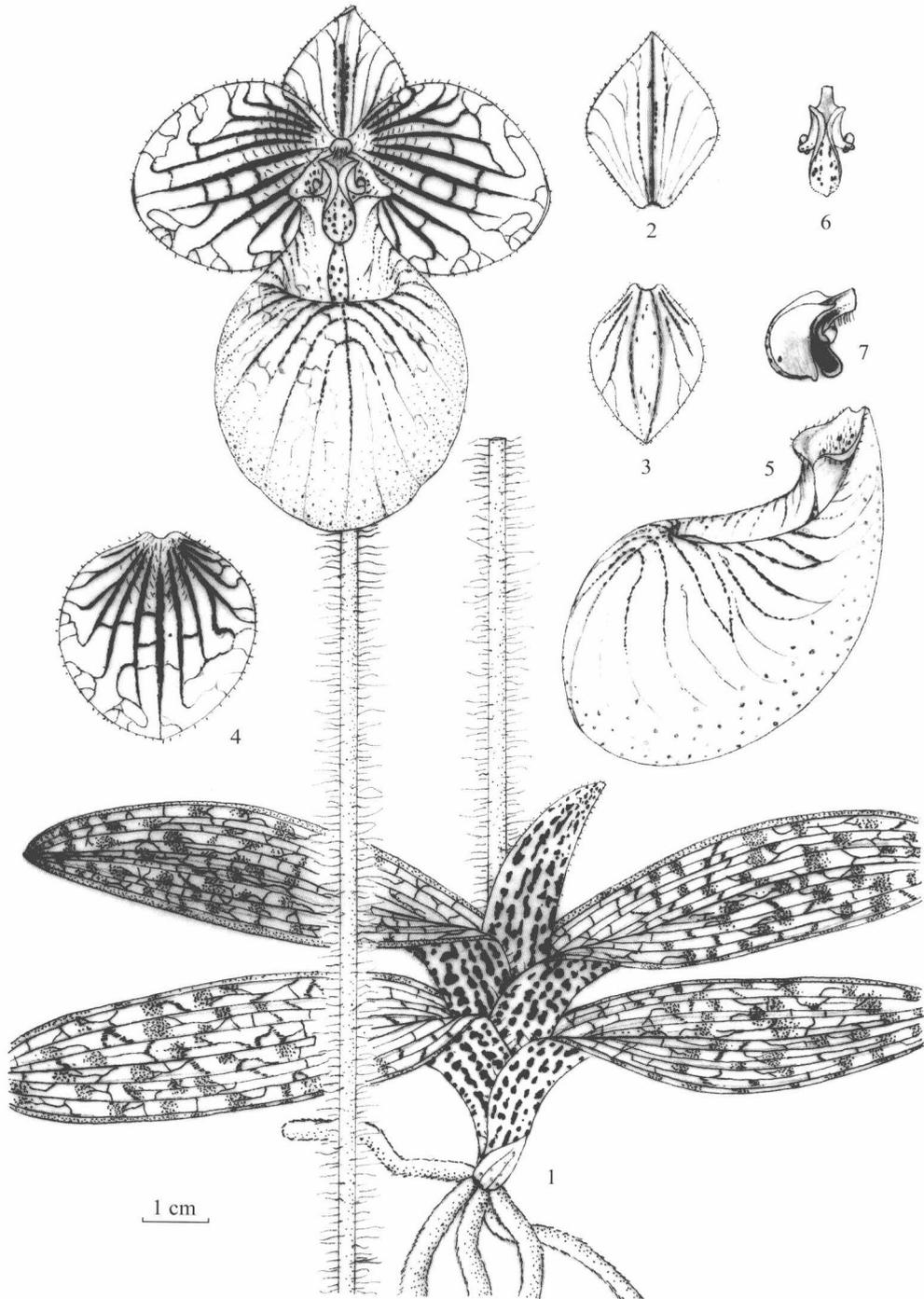


图 5-10. 硬叶兜兰: 1. 带花植株; 2. 中萼片; 3. 合萼片; 4. 花瓣; 5. 唇瓣, 侧面观; 6. 蕊柱, 正面观; 7. 蕊柱, 侧面观

Fig. 5-10. *Paphiopedilum micranthum*: 1. Flowering plant; 2. Dorsal sepal; 3. Synsepal; 4. Petal; 5. Lip, side view; 6. Column, front view; 7. Column, side view



图 5-11. 硬叶兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-11. *Paphiopedilum micranthum*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan



图 5-12. 硬叶兜兰：a. 在贵州东北部野外开花；b. 植株具长的走茎；c. 在栽培中开花；d. 叶的先端部分，示其上的金黄色鸟足状斑纹

Fig. 5-12. *Paphiopedilum micranthum*: a. Flowering in the wild in Northeast Guizhou; b. Plant with long stolons; c. Flowering in cultivation; d. Apical part of a leaf, showing golden pedate stripes on it



图版 2. 硬叶兜兰
Plate 2. *Paphiopedilum micranthum*

油画 作者: 李丝云
Oil painting by Si -yun Li



图版 3. 硬叶兜兰
Plate 3. *Paphiopedilum micranthum*

水彩画 作者: 吴俊强
Water color painting by Jun -qiang Wu

3. 德氏兜兰 (图5-13, 14, 15, 16) (Fig. 5-13, 14, 15, 16)

Paphiopedilum delenatii Guill. in Bull. Soc. Bot. France 71: 554. 1924; P. J. Cribb, Gen. Paphiopedilum: 89. 1987, et Gen. Paphiopedilum (ed. 2): 77. 1998; Braem, Paphiopedilum: 31. 1988; Seidenf. in Opera Bot. 114: 16. 1992; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 70. 1998; Aver. et al., Slipper Orch. Vietnam: 89. 2003. **Lectotype:** Vietnam, Tonkin, Delenat cult., Mornay s. n. (holotype, P!).

Cypripedium delenatii (Guill.) C. H. Curtis in Gard. Chron. ser. 3, 89: 208. 1931.

Paphiopedilum xichouense Z. J. Liu & S. C. Chen in J. Fairy Lake Bot. Gard. 17: 2. 2006.

Type: China, Yunnan, Xichou county, W. H. Rao 3209 (holotype, NOCC!).

地生植物。叶4—6枚，矩圆形，长8—12 cm，宽3.5—4.2 cm，上面具明显深浅绿色相间的网格斑，背面具密集的紫色斑点，先端钝，近叶面先端具金黄色的鸟足状斑纹，基部对折并在边缘具缘毛。花葶近直立，长21—30 cm，紫褐色，具密集的白色长硬毛；苞片近卵形，长约1.5 cm，淡绿色，具紫褐色小斑点，背面被毛；花梗和子房淡绿色，具密集紫红色斑点和白色长硬毛，长4—5 cm；花2朵或单朵，直径6—8 cm；中萼片、合萼片和花瓣白色，有模糊的浅粉红色斑点和脉纹，尤其在背面；唇瓣粉红色至浅紫红色；退化雄蕊白色，前半部有紫红色晕，中央有浅黄色斑块；中萼片卵形，长2.7—3.3 cm，宽1.7—2.5 cm，先端近急尖，两面被短柔毛；合萼片与中萼片相似，长2.1—3.1 cm；花瓣宽椭圆形，长3.5—4.4 cm，宽2.7—3.7 cm，先端浑圆；唇瓣深囊状，近球形，长3—3.8 cm，宽2.2—2.8 cm，前端边缘内卷，外面被微柔毛；退化雄蕊菱状卵形，长1.6—2 cm，宽1.6—1.8 cm，边缘具缘毛。 $2n=26, 38$ 。

花期：野外为3—4月。

分布：广西北部（柳州以北）、云南东南部（富宁县、西畴县和麻栗坡县）；越南南部和北部。

生境：石灰岩地区灌木和杂草丛生之地；海拔1000—1300 m。

说明：此种的中国植物与越南植物在形态上并无不同，只是花叶稍小。中国植物产于两个地点，一是广西北部地区，另一地点是云南东南部。少数植物被带回并种植于我们的苗圃中。它们易于栽培，甚至在酸性基质上也如此。但是使我们感到困惑的是，为什么它们没有在越南北部和中部再次被发现，虽然A. Guillaumin (1934) 报告说此种是从越南北部引种的。中国植物生于石灰岩地区，在干季的3—4月开花，而越南植物则不见于石灰岩地区，而开花期在雨季的12月和翌年1月。中国植物和越南植物之间的这种生态差异可能是一种启示，表明越南植物是后来衍生的。这个种曾经一度在越南北部被发现看来也未必是不可能的。德氏兜兰及其最亲近的种在中国均产石灰岩地区，而且是在干季开花的。然而越南南部的德氏兜兰，正如L. Averyanov等(2003)所指出，一般在雨季开花，此时它的花很经常被暴雨所摧毁。这表明它不能很好适应当地的气候。

类似的例子也见于紫纹兜兰 (*P. purpuratum*)。紫纹兜兰是在香港发现的，在那

里它是生长于次生林下的酸性土壤上，花期为10月至翌年1月。但是，在云南东南部和越南北部，它是生于石灰岩地区，花期为6—8月。后者曾一度被作为新种：夏花兜兰 (*P. aestivum*)，但现在已并入紫纹兜兰作为异名。

该种之下有一个白花变型 (*f. albinum* Braem)，发表于1998年。

Terrestrial plants. Leaves 4–6, distichous, oblong, 8–12 cm long, 3.5–4.2 cm wide, adaxially tessellated with dark and light green, abaxially heavily purple-spotted and carinate, obtuse at apex, marked with golden pedate stripes toward adaxial apex, base conduplicate and ciliate. Scape suberect, 21–30 cm long, purple-brown, densely white-hirsute; bract ovate, ca. 1.5 cm long, pale green with purple-brown spots, abaxially hairy; pedicel and ovary pale green densely spotted with purple-red, white-hirsute, 4–5 cm long; flowers 2 or 1, 6–8 cm across; dorsal sepal, synsepal and petals white, obscurely spotted and veined with pale pink particularly on dorsal surface; lip pink to pale purple-red; staminode whitish marked with purple-red in apical half and pale yellow centrally; dorsal sepal ovate, 2.7–3.3 cm long, 1.7–2.5 cm wide, subacute at apex, pubescent on both surfaces; synsepal similar to dorsal sepal, 2.1–3.1 cm long; petals broadly elliptic, 3.5–4.4 cm long, 2.7–3.7 cm wide, rounded at apex; lip deep pouched, subglobose, 3–3.8 cm long, 2.2–2.8 cm wide, apical margins involute, puberulous outside; staminode rhombic-ovate, 1.6–2 cm long, 1.6–1.8 cm wide, ciliate. $2n=26$, 38.

Flowering period: March and April in the wild.

Distribution: N Guangxi (to the north of Liuzhou city), SE Yunnan (Funing county, Xichou county and Malipo county); S & N Vietnam.

Habitat: In shrubby and grassy places in limestone areas; alt. 1000–1300 m.

Note: The Chinese plants of this species show little difference in floral morphology from its Vietnamese ones, except slightly smaller flower and leaves. The Chinese plants were found in two places, one in northern Guangxi and the other in southeastern Yunnan. A few individuals were brought back and cultivated in our nursery. They were easy to grow, even in acidic media. However, we are in puzzle as to why they have not been rediscovered in northern or central Vietnam, though A. Guillaumin (1934) reported that this species was introduced from northern Vietnam. The Chinese plants dwell in limestone areas and flower in March and April during the dry season, while the Vietnamese ones are not found in limestone area and flower in December and January during the rainy season. The ecological discrepancies between Chinese and Vietnamese plants may be a suggestion that the latter be derivative. Apparently it is not necessarily impossible that this species has once occurred in northern Vietnam. *P. delenatii* and its closest allies all grow in limestone areas and flower in dry season in China. *P. delenatii* in southern Vietnam, however, as pointed out by L. Averyanov et al.(2003), commonly flowers in rainy season, when its flowers are very

often damaged by heavy torrential rains. This is an indication that the plants are not very adaptable to the local climate there.

A similar example can be offered by *P. purpuratum*. This species was described from Hongkong where it grows in acidic soil in secondary forests and flowers from October to January. In southeastern Yunnan and northern Vietnam, however, this species occurs in limestone areas and flowers from June to August. The latter was once treated as a new species, *P. aestivum*, but now reduced to synonymy of *P. purpuratum*.

An albino form of this species was described in 1998: f. *albinum* Braem.

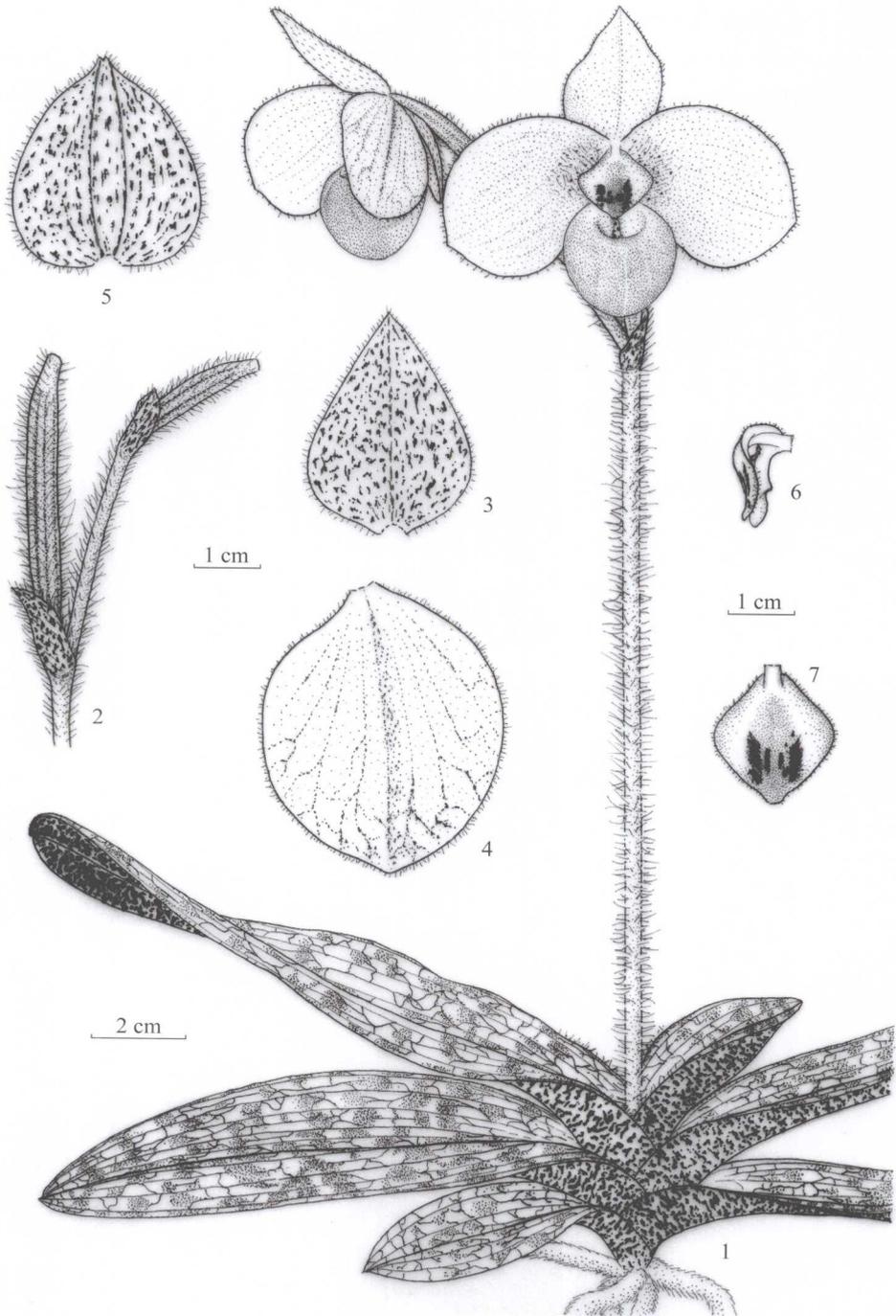


图 5-13. 德氏兜兰: 1. 带花植株; 2. 苞片和子房; 3. 中萼片, 背面观; 4. 花瓣, 背面观; 5. 合萼片, 背面观; 6. 蕊柱; 7. 退化雄蕊

Fig. 5-13. *Paphiopedilum delenatii*: 1. Flowering plant; 2. Bract and ovary; 3. Dorsal sepal, back view; 4. Petal, back view; 5. Synsepal, back view; 6. Column; 7. Staminode

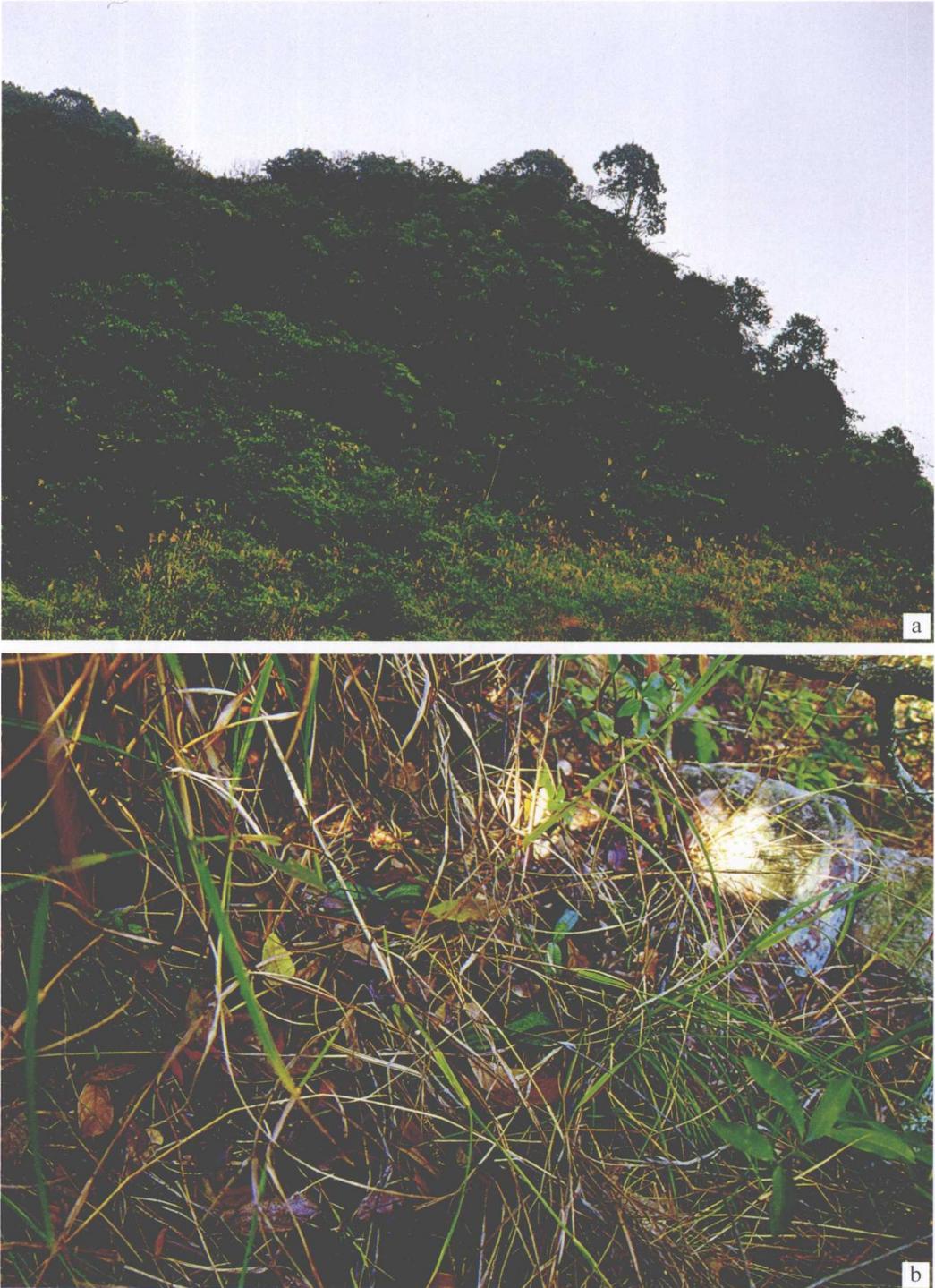


图 5-14. 德氏兜兰: a. 在云南东南部的自然生境; b. 在云南东南部自然生境中的幼苗
Fig. 5-14. *Paphiopedilum delenatii*: a. Its natural habitat in Southeast Yunnan; b. Seedlings in its habitat in Southeast Yunnan

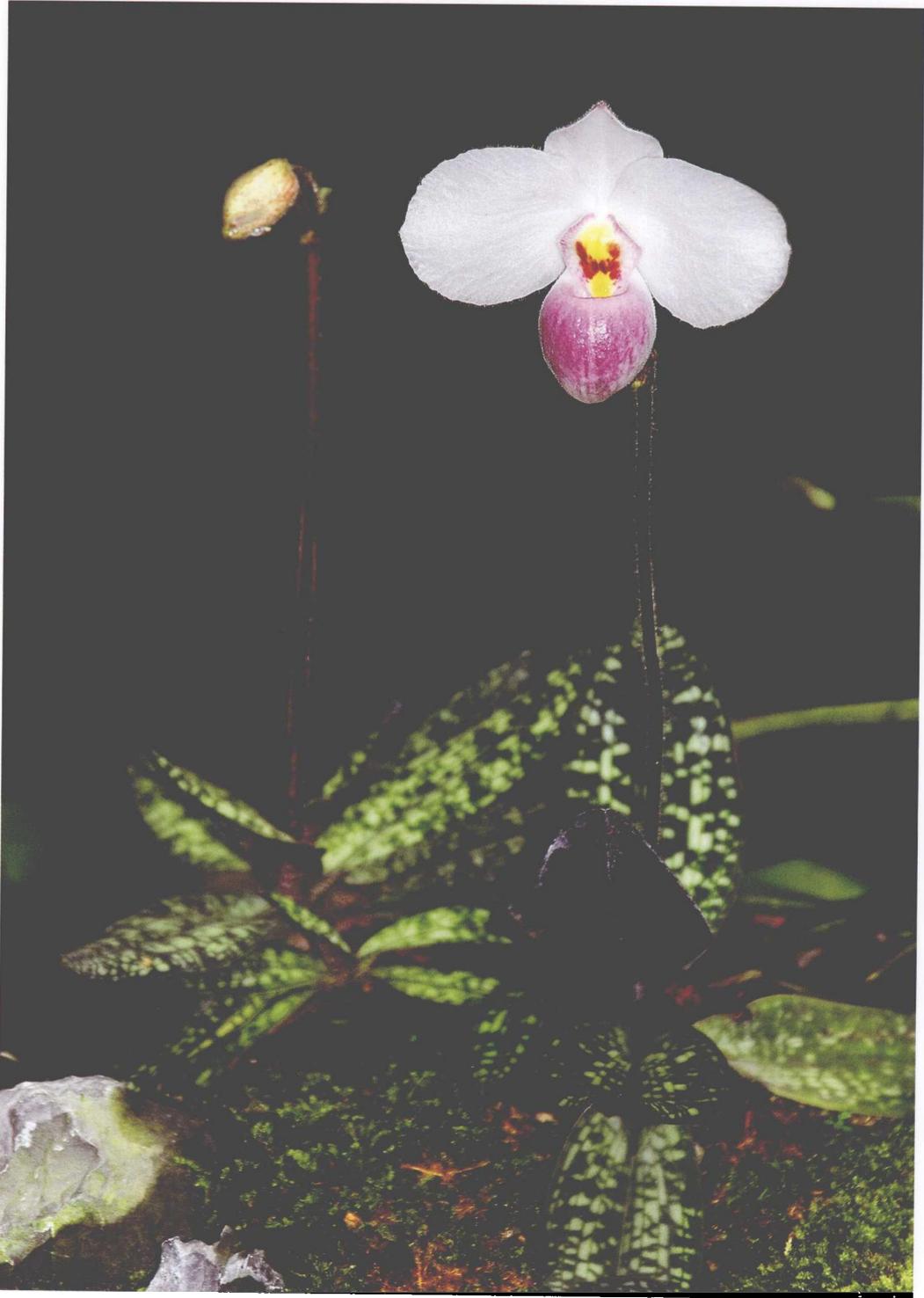


图 5-15. 德氏兜兰：在栽培中开花

Fig. 5-15. *Paphiopedilum delenatii*: Flowering in cultivation



图 5-16. 德氏兜兰: a. 生长于云南东南部的自然生境中; b. 在栽培中开花; c. 在栽培中结果; d. 叶的先端部分, 示其上的金黄色鸟足状斑纹

Fig. 5-16. *Paphiopedilum delenatii*: a. Growing in its natural habitat in Southeast Yunnan; b. Flowering in cultivation; c. Fruiting in cultivation; d. Apical part of a leaf, showing golden pedate stripes on it

4. 杏黄兜兰 (图5-17, 18, 19, 20; 图版4) (Fig. 5-17, 18, 19, 20; Pl. 4)

Paphiopedilum armeniacum S. C. Chen & F. Y. Liu in Acta Bot. Yunnan. 4 (2): 163. 1982; Koop. & N. Haseg. in Orchid Advocate 9: 188. 1983, et in Orchid Digest 48: 95. 1984; F. Mark in Orchid Digest 51: 67. 1987; P. J. Cribb, Gen. Paphiopedilum: 88. 1987, et Gen. Paphiopedilum (ed. 2): 72. 1998; Braem, Paphiopedilum: 27. 1988; Z. H. Tsi, S. C. Chen & K. Mori, Wild Orch. China: 24. 1997; S. C. Chen & Z. H. Tsi, Orch. China: 118. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 66. 1998; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 322. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 56. 1999. **Type:** China, Yunnan, Bijiang, A. R. Zhang 7901 (holotype, KUN!).

Paphiopedilum armeniacum var. *mark-fun* Fowlie in Orchid Digest 50: 205. 1987. nom. invalid.

Paphiopedilum armeniacum var. *undulatum* Z. J. Liu & J. Yong Zhang in Acta Phytotax. Sin. 39 (5): 458. 2001. **Type:** China, Yunnan, cult., Z. J. Liu 21317 (holotype, NOCC!).

Paphiopedilum armeniacum var. *parviflorum* Z. J. Liu & J. Yong Zhang in Acta Phytotax. Sin. 39 (5): 495. 2001. **Type:** China, Yunnan, Gaoligong Mt., Z. J. Liu 21319 (holotype, NOCC!).

地生或石上附生植物, 地下常具数条或多条走茎; 走茎横走, 长超过10 cm, 直径2—3 mm。叶二列, 4—7枚, 矩圆形至狭矩圆形, 坚革质, 长5—18 cm, 宽1.5—3.5 cm, 先端急尖或同时具3小齿, 上面有深浅绿色相间的网格斑, 背面有密集的紫色斑点并具龙骨状突起, 边缘有细齿。花葶直立, 长10—28 cm, 浅黄绿色并密生紫色斑点, 被短柔毛; 苞片卵状披针形或卵形, 长1.4—1.8 cm, 淡绿黄色并有紫色斑点, 稍被毛; 花梗和子房长2—4 cm, 被白色短柔毛; 花单朵, 直径5—9 (—11) cm, 黄色、淡黄绿色或金黄色, 有时萼片与花瓣背面先端绿色; 退化雄蕊上有浅栗色脉纹; 中萼片卵形, 长2.1—4.8 cm, 宽1.4—2.5 cm, 先端近急尖, 两面被短柔毛; 合萼片与中萼片相似, 但略小, 背面有2条钝的龙骨状突起; 花瓣宽卵状椭圆形至近圆形, 长2.8—5.3 cm, 宽2.5—4.8 cm, 先端急尖或近浑圆, 边缘稍波状, 上面基部具白色长柔毛; 唇瓣深囊状, 近球形, 长4—6 cm, 宽2.5—4 cm, 先端边缘内卷; 退化雄蕊宽卵形或卵圆形, 长、宽各1.2—2.2 cm, 先端急尖, 边缘下弯。2n=26。

花期: 野外为3—5月。

分布: 云南西部 (沿怒江分布, 南边从施甸县开始向北可到福贡县北部和维西县西南部)。

生境: 石灰岩地区树木和灌木生长的山坡的岩石缝隙中或多石、排水良好之地; 海拔1400—2250 m。

说明: 基于退化雄蕊和唇瓣内表面不具近红色的斑, 亦即白化型, 建立了麦氏变型f. *markii* (Gruss) Braem (1998)。

Terrestrial or lithophytic plants, often with several to many creeping stolons over 10 cm long and 2–3 mm thick. Leaves 4–7, oblong or narrow-oblong, thick-coriaceous, 5–18 cm long, 1.5–3.5 cm wide, acute or also tridenticulate at apex, adaxially tessellated with dark and light green, abaxially densely purple-spotted and carinate, serrulate-margined. Scape erect, 10–28 cm long, pale yellow-green densely spotted with purple, pubescent; bract ovate-lanceolate or ovate, 1.4–1.8 cm long, pale yellow-green spotted with purple, puberulous; pedicel and ovary 2–4 cm long, white-pubescent; flower single, 5–9(–11) cm across, yellow, pale yellow-green or golden yellow; sepals and petals sometimes slightly flushed with pale green toward their abaxial apices; staminode with pale maroon veins; dorsal sepal ovate, 2.1–4.8 cm long, 1.4–2.5 cm wide, subacute at apex, pubescent on both surfaces; synsepal similar to dorsal sepal, slightly smaller, obtusely bicarinate abaxially; petals broadly ovate-elliptic to suborbicular, 2.8–5.3 cm long, 2.5–4.8 cm wide, subacute or rounded at apex, slightly undulate-margined, ciliate, white-villose toward adaxial base; lip deep pouched, subglobose, 4–6 cm long, 2.5–4 cm wide, with involute margins apically; staminode broadly ovate or ovate-orbicular, 1.2–2.2 cm long and wide, acute at apex, margins recurved. $2n=26$.

Flowering period: March to May in the wild.

Distribution: W Yunnan (along Nu River from Shidian county in the south to the North of Fugong county and the Southwest of Weixi county in the north).

Habitat: In rocky and well-drained places or in crevices of rocks on wooded or bushy slopes in limestone areas; alt. 1400–2250 m.

Note: An albino form, f. *markii* (Gruss) Braem (1998), was recognized, which is characterized by the absence of the reddish marks on the staminode and the inner surface of the lip.

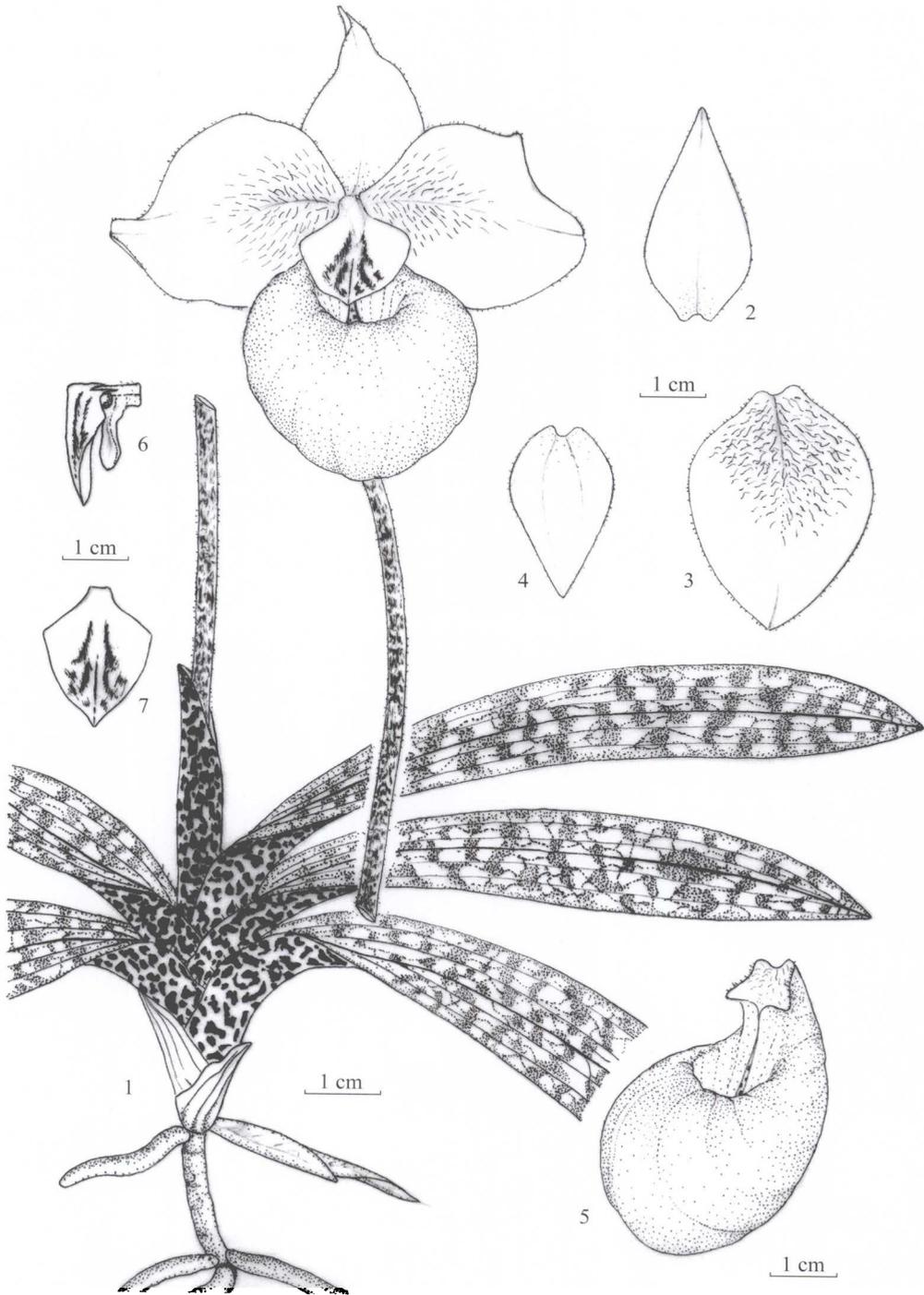


图 5-17. 杏黄兜兰: 1. 带花植株; 2. 中萼片; 3. 花瓣; 4. 合萼片; 5. 唇瓣, 侧面观; 6. 蕊柱; 7. 退化雄蕊

Fig. 5-17. *Paphiopedilum armeniacum*: 1. Flowering plant; 2. Dorsal sepal; 3. Petal; 4. Synsepal; 5. Lip, side view; 6. Column; 7. Staminode



图 5-18. 杏黄兜兰: a. 在云南西部的自然生境; b. 在云南西部野外开花

Fig. 5-18. *Paphiopedilum armeniacum*: a. Its natural habitat in western Yunnan; b. Flowering in the wild in western Yunnan

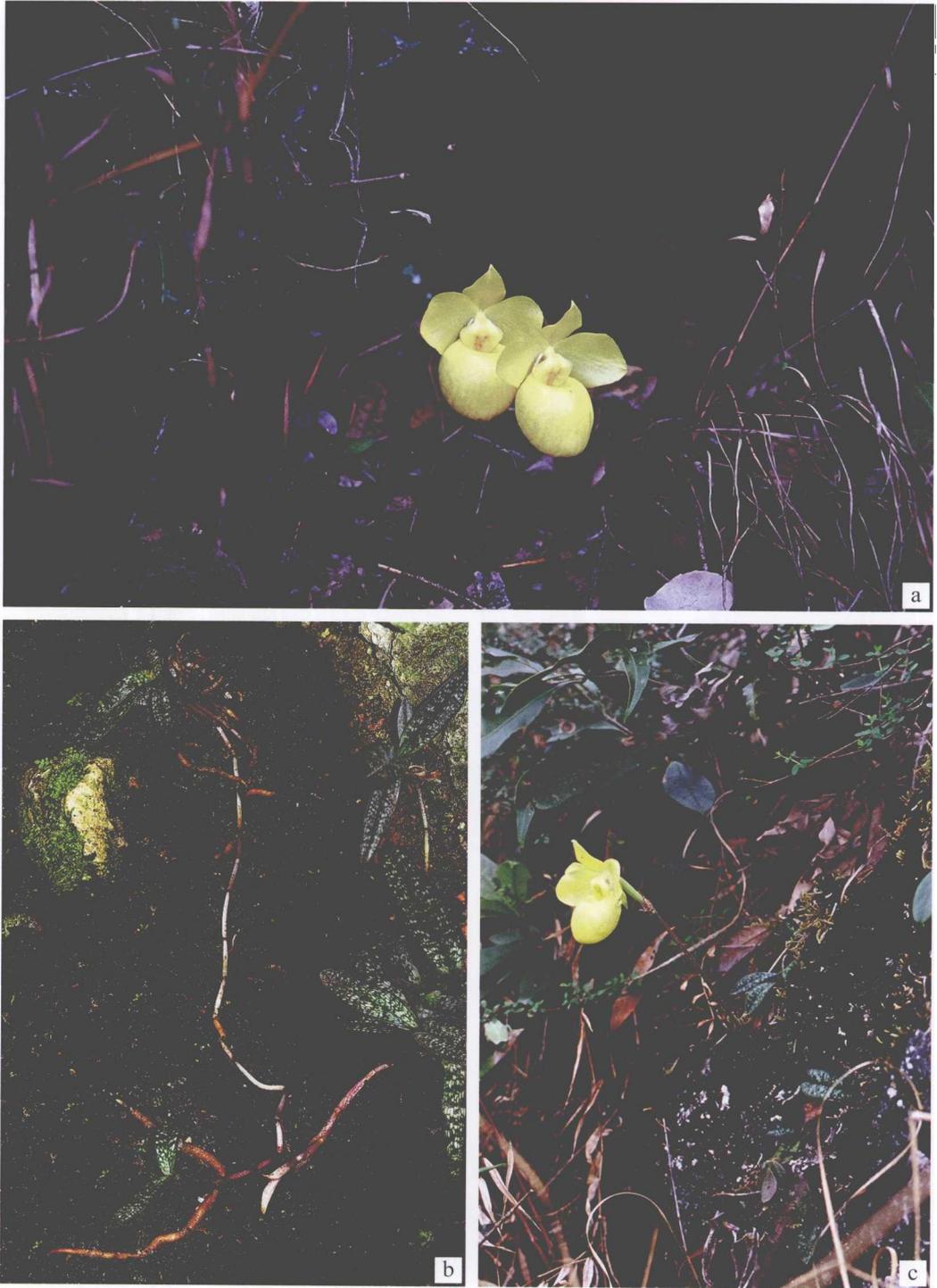


图 5-19. 杏黄兜兰: a, c. 在云南西部野外开花; b. 植株具长的走茎
Fig. 5-19. *Paphiopedilum armeniacum*: a, c. Flowering in the wild in western Yunnan; b. Plant with long stolons



图 5-20. 杏黄兜兰: a. 在云南西部野外开花; b, c. 在栽培中开花
Fig. 5-20. *Paphiopedilum armeniacum*: a. Flowering in the wild in western Yunnan; b, c. Flowering in cultivation



图版 4. 杏黄兜兰
Plate 4. *Paphiopedilum armeniacum*

水彩画 作者: 吴俊强
Water color painting by Jun -qiang Wu

5. 白花兜兰 (图5-21, 22, 23; 图版5) (Fig. 5-21, 22, 23; Pl. 5)

Paphiopedilum emersonii Koop. & P. J. Cribb in *Orchid Advocate* 12: 86. 1986; Braem, *Paphiopedilum*: 34. 1988; S. C. Chen & Z. H. Tsi, *Orch. China*: 119. 1997; P. J. Cribb, *Gen. Paphiopedilum* (ed. 2): 100. 1998; Braem, C. Baker & M. Baker, *Gen. Paphiopedilum Nat. Hist. Cult.* 1: 74. 1998; S. C. Chen, Z. H. Tsi & Y. B. Luo, *Native Orch, China Colour*: 330. 1999; S. C. Chen in K. Y. Lang (ed.), *Flora Reipubl. Popul. Sin.* 17: 58. 1999; Aver. et al., *Slipper Orch. Vietnam*: 140. 2003. **Type**: China, cult. E. W. Charles (holotype, K!).

地生或石上附生植物。叶4—6枚，二列，狭矩圆形，长8—21 cm，宽2.5—4 (—5) cm，先端近急尖，上面深绿色，但有时在一些叶面上可看到极淡的网格斑，背面淡绿色或在基部有紫红色斑点，基部边缘具缘毛。花葶直立，长9—17 cm，淡绿黄色，被疏柔毛；苞片宽椭圆形，长2.8—3.8 cm，宽1.5—2 cm，近白色；花梗和子房长2.5—3.5 cm，被白色疏柔毛；花单朵，直径8—9 (—10) cm，稍有香气；萼片与花瓣白色，有时花瓣基部有少量栗色或红色细斑点；唇瓣一般淡黄色或后来变为黄色，囊内有深紫色斑点；退化雄蕊淡黄色或乳白的黄色，在上半部有大量栗色斑纹；中萼片椭圆状卵形，长3—5 cm，宽2—3.5 cm，先端钝，两面被短柔毛；合萼片宽椭圆形或近圆形，长与宽各2.5—4 cm，先端钝，两面被微柔毛；花瓣宽椭圆形至近圆形，长3.5—6 cm，宽2.5—5 cm，先端钝或浑圆，两面略被细毛，上面近基部有长柔毛；唇瓣深囊状，近球形，长3—4.5 cm，宽2—3 cm，先端边缘内弯且沿脉稍凹入；退化雄蕊鳄鱼头状，长1.5—2 cm，宽8—12 mm，上面中央具深的纵槽，先端钝。 $2n=26$ 。

花期：野外为4—6月。

分布：广西中部至西部（河池县、都安县、大化县）、贵州南部（荔波县）；越南北部。

生境：生于石灰岩地区灌木林下陡峭的岩石缝中或荫蔽的岩壁上；海拔600—800 m。

说明：格蓝兜兰（杂种）*Paphiopedilum* × *glanzii* Gruss & Perner [in *Die Orchidee* 57 (3): 315. 2006]为该种与硬叶兜兰 (*P. micranthum*) 之间的天然杂种，产于中国。该杂种与人工杂种 *Paph. Lola Bird* (*P. micranthum* × *P. emersonii*) 的花特征几乎完全相同。此外，该种之下曾记载有两个变型：黄花变型 *f. luteum* Braem (2001) 与白花变型 *f. album* Gruss & Petchl. (2002)。

Terrestrial or lithophytic plants. Leaves 4–6, distichous, narrowly oblong, coriaceous, 8–21 cm long, 2.5–4 (–5) cm wide, adaxially uniformly deep green or sometimes very obscurely tessellated with deep and light green, abaxially pale green or with purple-red spots toward the base, ciliate along basal margins. Scape erect, 9–17 cm long, pale yellow-green, pilose; bract broadly elliptic, 2.8–3.8 cm long, 1.5–2 cm wide, whitish; pedicel and ovary 2.5–3.5 cm long, white-pilose; flower single, 8–9 (–10) cm across, slightly fragrant; sepals and petals white, sometimes with a few maroon or red spots toward their base; lip

commonly pale yellow or turning yellow with the elapse of time, spotted with deep purple within; staminode pale yellow or whitish-yellow, with maroon markings in apical half; dorsal sepal elliptic-ovate, 3–5 cm long, 2–3.5 cm wide, obtuse at apex, puberulous on both surfaces; synsepal broadly elliptic or suborbicular, 2.5–4 cm long and wide, obtuse at apex, puberulous on both surfaces; petals broadly elliptic to suborbicular, 3.5–6 cm long, 2.5–5 cm wide, obtuse or rounded at apex, sparsely puberulous on both surfaces except the villose adaxial base; lip deep pouched, subglobose, 3–4.5 cm long, 2–3 cm wide, apical margin incurved and slightly grooved along veins; staminode looking like a crocodile head, 1.5–2 cm long, 8–12 mm wide, deeply longitudinal-grooved centrally, obtuse at apex. $2n=26$.

Flowering period: April to June in the wild.

Distribution: C to W Guangxi (Hechi county, Duan county, Dahua county), S Guizhou (Libo county); N Vietnam.

Habitat: On shady cliffs or crevices of steep rocks in thickets in limestone areas at an elevation of 600–800 m.

Note: *Paphiopedilum* × *glanzii* Gruss & Perner [in *Die Orchidee* 57 (3): 315. 2006], a natural hybrid between this species and *P. micranthum*, was described from China. Its floral features look almost the same as those of the artificial hybrid *Paph. Lola Bird* (*P. micranthum* × *P. emersonii*). Besides, two forms of this species have been described: f. *luteum* Braem (2001) and f. *album* Gruss & Petchl. (2002).

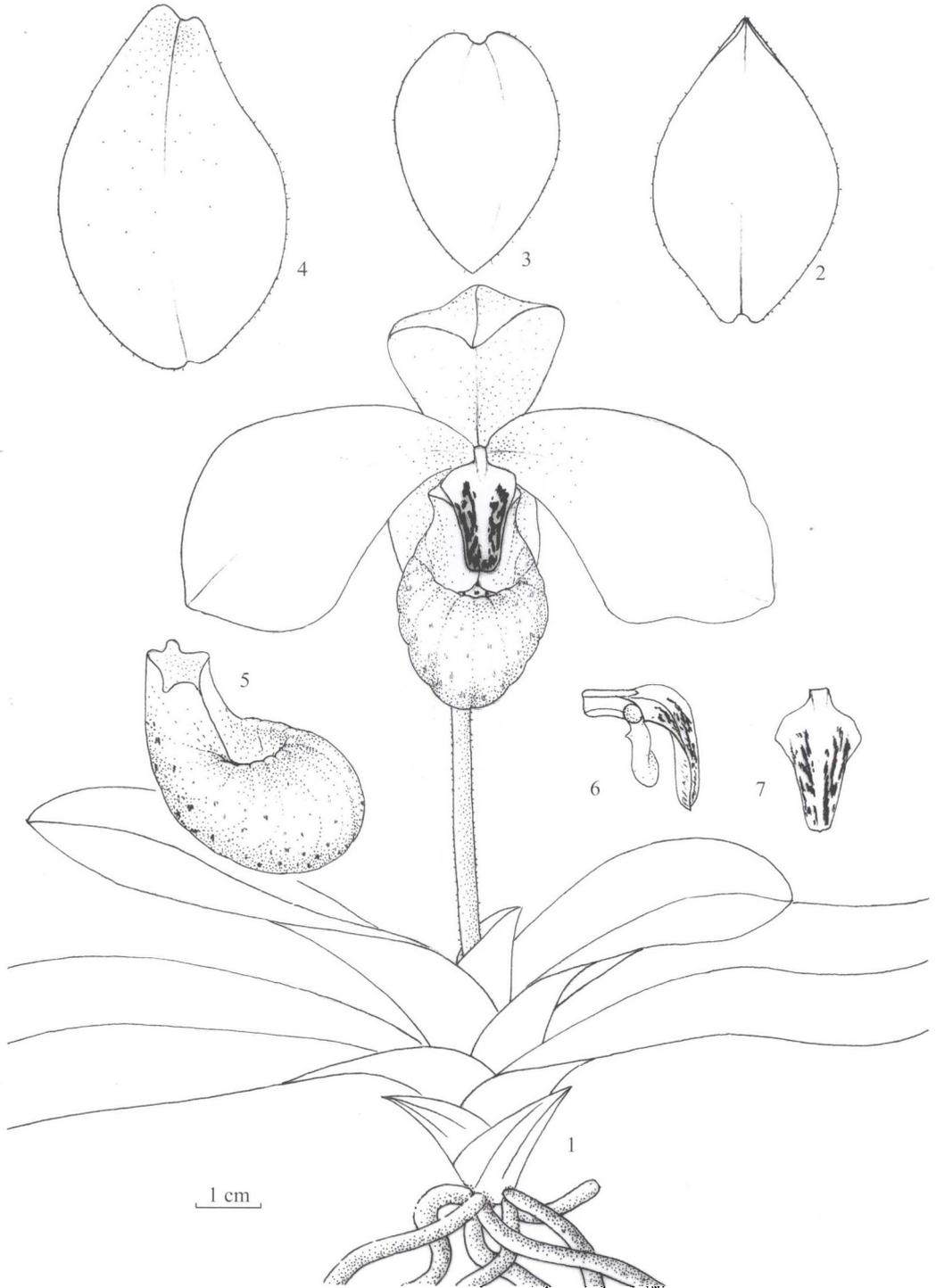


图 5-21. 白花兜兰: 1. 带花植株; 2. 中萼片; 3. 合萼片; 4. 花瓣; 5. 唇瓣, 侧面观; 6. 蕊柱; 7. 退化雄蕊

Fig. 5-21. *Paphiopedilum emersonii*: 1. Flowering plant; 2. Dorsal sepal; 3. Synsepal; 4. Petal; 5. Lip, side view; 6. Column; 7. Staminode

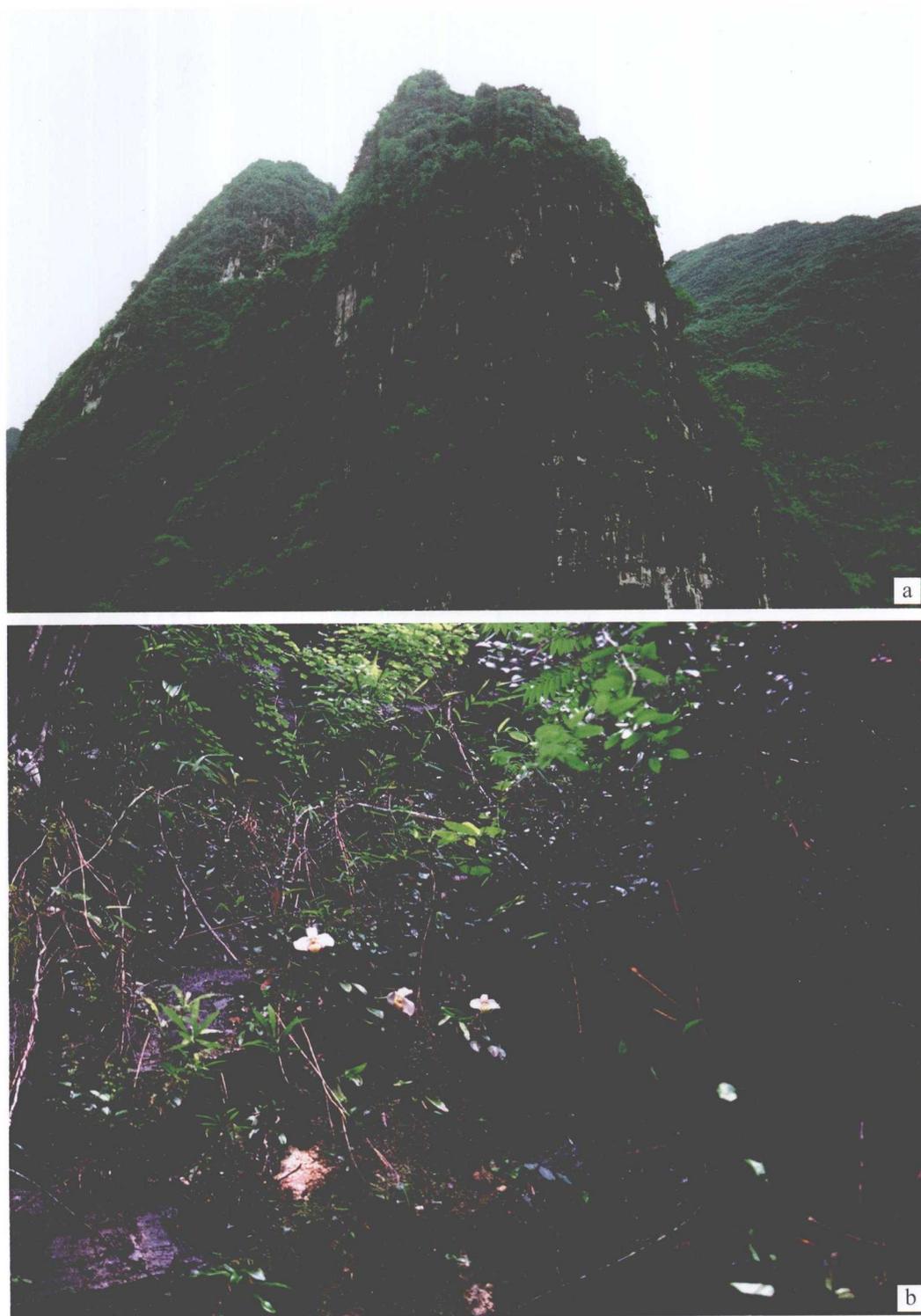
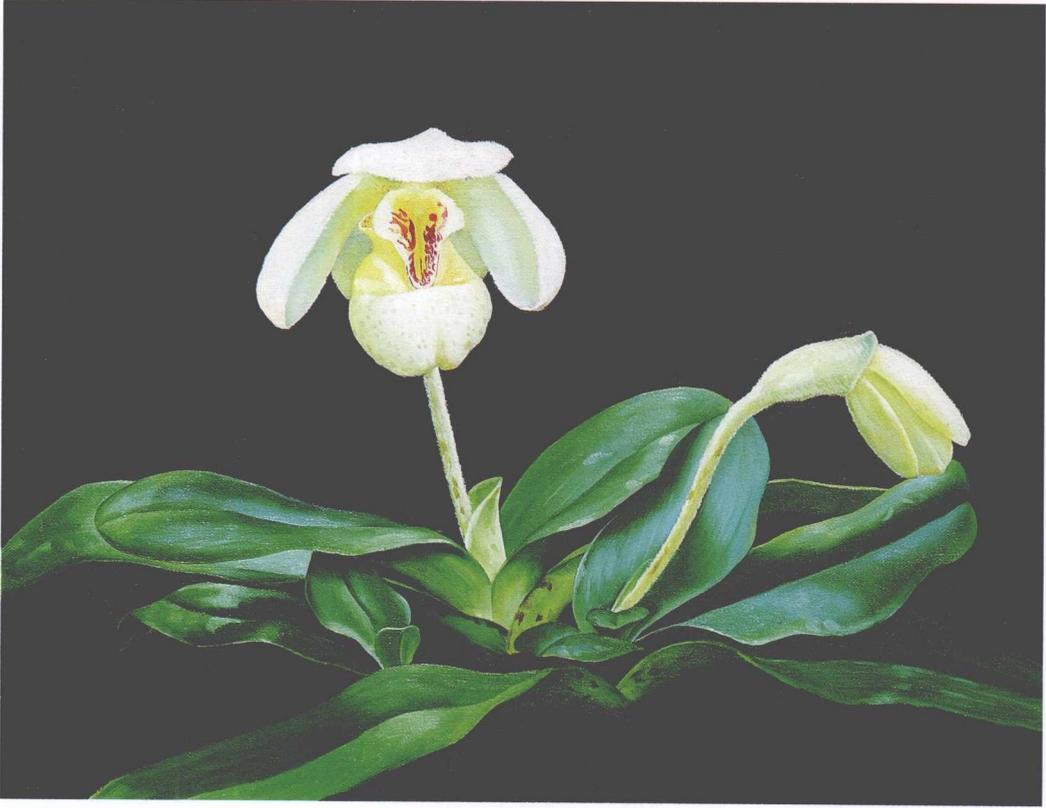


图 5-22. 白花兜兰: a. 在贵州南部的自然生境; b. 在贵州南部野外开花

Fig. 5-22. *Paphiopedilum emersonii*: a. Its natural habitat in southern Guizhou; b. Flowering in the wild in southern Guizhou



图 5-23. 白花兜兰: a-c. 在广西中部野外开花; d. 在栽培中开花
Fig. 5-23. *Paphiopedilum emersonii*: a-c. Flowering in the wild in central Guangxi; d. Flowering in cultivation



图版 5. 白花兜兰
Plate 5. *Paphiopedilum emersonii*

油画 作者: 李丝云
Oil painting by Si -yun Li

6. 汉氏兜兰 (图5-24, 25, 26) (Fig. 5-24, 25, 26)

Paphiopedilum hangianum Perner & Gruss in Die Orchidee, Beih. 6: 3. 1999; Aver. et al., Slipper Orch. Vietnam: 131. 2003. **Type:** N Vietnam, Bac Thai, T. N. Hang s. n., cult. Gruss (holotype, HAL 072655).

Paphiopedilum singchii Z. J. Liu & J. Yong Zhang in Acta Phytotax. Sin. 38 (5): 468. 2000.

Type: China, SE Yunnan bordering Vietnam, Z. J. Liu 2501 (holotype, NOCC!).

石上附生植物。叶4—6枚，二列，革质，狭椭圆形，长12—28 cm，宽3.5—5.9 cm，先端钝，上面深绿色，有光泽，背面淡绿色并有龙骨状突起，基部边缘具紫色缘毛。花葶近直立，长13—23 cm，淡黄绿色，有时有紫色细斑点，密被白色短柔毛；苞片卵状椭圆形，长2.5—3 cm，宽2—2.5 cm，淡黄绿色，有时具紫色斑点，边缘具缘毛，背面被白色短柔毛；花梗和子房长3—4.5 cm，绿色，具紫色斑点，密被白色短柔毛；花单朵，直径11—14 cm，稍有香气，淡黄色至浅黄绿色；花瓣近基部有淡紫红色晕；唇瓣囊底具紫色斑点；退化雄蕊具紫红色横脉纹；中萼片宽卵状椭圆形，长4.8—6.2 cm，宽3—4.6 cm，先端钝，两面具细柔毛，边缘有细缘毛；合萼片宽椭圆形，长4.8—6.4 cm，宽3.6—5.7 cm，两面亦具毛；花瓣宽卵状椭圆形，稍斜歪，长5—6.5 cm，宽3—4.5 cm，两面被微柔毛，基部具密集的白色长柔毛，边缘具缘毛；唇瓣深囊状，近球形，长3.5—5 cm，宽2.5—3.4 cm，前端边缘内卷；蕊柱基部被白色短柔毛；退化雄蕊宽倒卵状三角形，长1.6—2.1 cm，宽1.8—2.2 cm，先端钝圆，基部骤然收狭成短爪。2n=26。

花期：野外为4—5月。

分布：广西西南部（那坡县、靖西县与越南交界处）、云南东南部（金平县与越南交界处）；越南北部。

生境：生于十分潮湿但排水良好之地，常在水帘或瀑布之后方。

说明：该种之下已知有一个白化型：白花变型 (f. *album* Gruss & Petchl.) (2002)。

Lithophytic plants. Leaves 4–6, distichous, coriaceous, narrowly oblong, 12–28 cm long, 3.5–5.9 cm wide, obtuse at apex, uniformly deep green and glossy adaxially, pale green and carinate abaxially, purple-ciliate along basal margins. Scape suberect, 13–23 cm long, pale yellow-green, sometimes with purple spots, densely white-pubescent; bract ovate-elliptic, 2.5–3 cm long, 2–2.5 cm wide, pale yellow-green, sometimes with purple spots, ciliate, puberulous abaxially; pedicel and ovary 3–4.5 cm long, green with purplish spots, densely puberulous; flower single, 11–14 cm across, slightly scented, pale yellow to pale yellow-green, flushed with pale purple toward the base of the petals, densely spotted with purple at the inner bottom of the lip, and with many purple irregular-transverse stripes or net on upper surface of the staminode; dorsal sepal broadly ovate-elliptic or elliptic, often curving forward over the lip, 4.8–6.2 cm long, 3–4.6 cm wide, acute at apex, puberulous on both surfaces, minutely ciliate; synsepal broadly elliptic, 4.8–6.4 cm long, 3.6–5.7 cm

wide; puberulous on both surfaces; petals broadly ovate-elliptic, slightly oblique, 5–6.5 cm long, 3–4.5 cm wide, puberulous on both surfaces, adaxially densely white-villose toward the base, minutely ciliate; lip deep pouched, subglobose, 3.5–5 cm long, 2.5–3.4 cm wide, apical margins involute, glabrous outside; staminode broadly obovate-triangular, 1.6–2.1 cm long, 1.8–2.2 cm wide, obtuse-rounded at apex, abruptly narrowed basally into a short claw. $2n=26$.

Flowering period: April and May in the wild.

Distribution: SW Guangxi (Napo county and Jingxi county bordering Vietnam), SE Yunnan (Jinping county bordering Vietnam); N Vietnam.

Habitat: In very wet but well drained places, usually behind water curtain or waterfall; alt. unknown.

Note: An albino form of this species is known to us : f. *album* Gruss & Petchl. (2002).

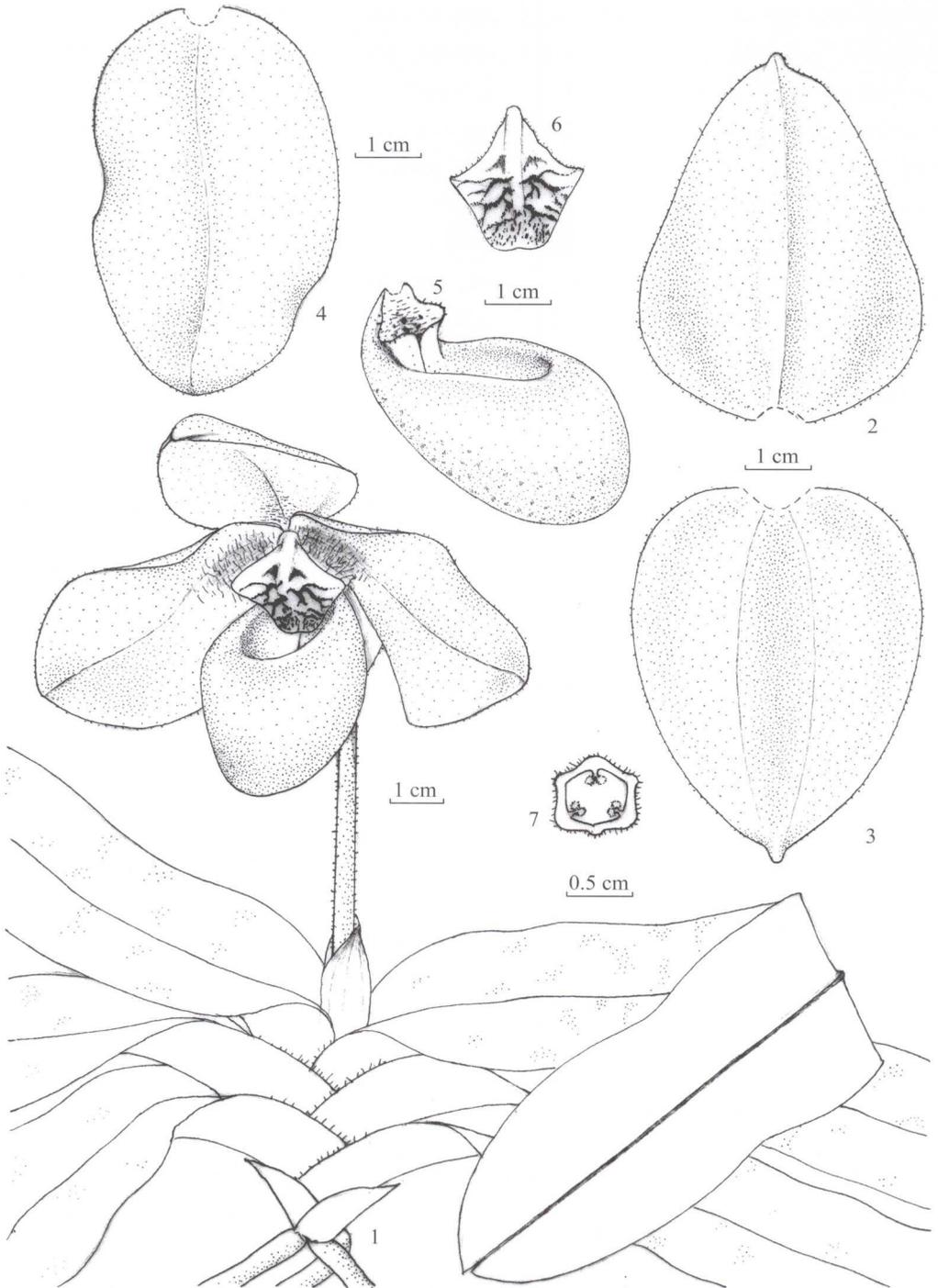


图 5-24. 汉氏兜兰: 1. 带花植株; 2. 中萼片, 背面观; 3. 合萼片, 背面观; 4. 花瓣, 背面观; 5. 唇瓣, 侧面观; 6. 退化雄蕊; 7. 子房横切面

Fig. 5-24. *Paphiopedilum hangianum*: 1. Flowering plant; 2. Dorsal sepal, back view; 3. Synsepal, back view; 4. Petal, back view; 5. Lip, side view; 6. Staminode; 7. Ovary cross section

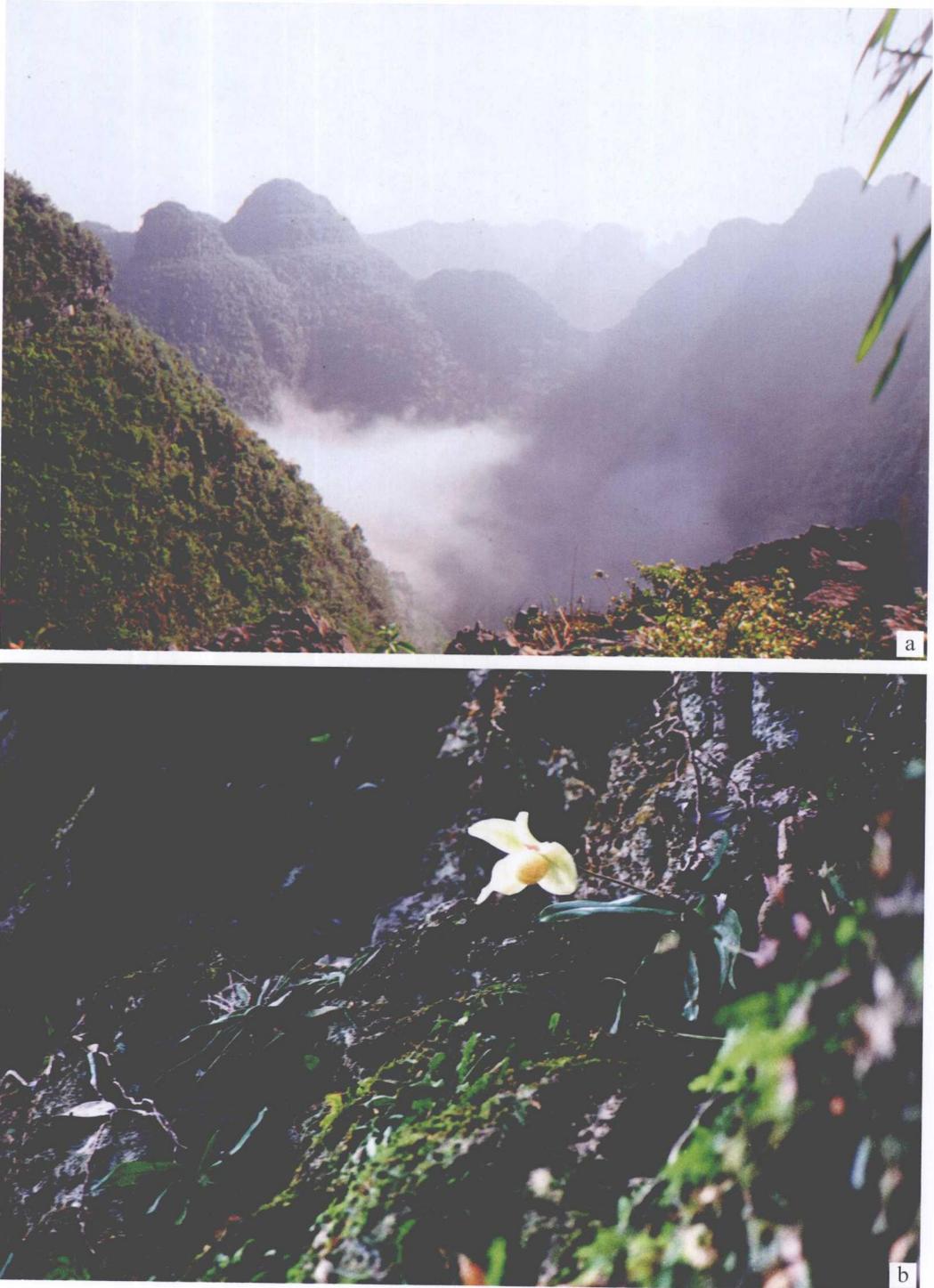


图 5-25. 汉氏兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-25. *Paphiopedilum hangianum*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan



图 5-26. 汉氏兜兰: a. 生于云南东南部的自然生境中; b-d. 在栽培中开花
Fig. 5-26. *Paphiopedilum hangianum*: a. Growing in its natural habitat in Southeast Yunnan; b-d. Flowering in cultivation

7. 同色兜兰 (图5-27, 28, 29; 图版6) (Fig. 5-27, 28, 29; Pl. 6)

Paphiopedilum concolor (Lindl. ex Bateman) Pfitzer in Engler & Prantl, Natur. Pflanzenf. 2, 6: 84. 1889, et in Engler, Pflanzenreich IV (50) Heft 12: 57. 1903; Fowlie in Orchid Digest 41: 190. 1977 et 42: 73. 1978; Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 33. 1982; P. J. Cribb, Gen. Paphiopedilum: 78. 1987, et Gen. Paphiopedilum (ed. 2): 110. 1998; Braem, Paphiopedilum: 48. 1988; Seidenf. in Opera Bot. 114: 16. 1992; S. C. Chen & Z. H. Tsi, Orch, China: 119. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 98. 1998; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 327. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 59. 1999; Aver. et al., Slipper Orch. Vietnam: 145. 2003. **Type:** Myanmar, cult. Rucker, Parish s. n. (holotype, K!; isotype, W).

Cypripedium concolor Lindl. ex Bateman in Curtis's Bot. Mag. 91: t. 5513. 1865.

Cordula concolor (Lindl. ex Bateman) Rolfe in Orchid Rev. 20: 2. 1912.

地生或石上附生植物。叶4—7枚，矩圆形至狭椭圆形，长8—16 cm，宽3—5.2 cm，先端钝并略2浅裂，上面有深浅绿色或绿色与乳白色相间的网格斑，背面具极密集的紫点或几乎完全紫色。花葶近直立，长7—10 cm，绿色并具密集的紫褐色细斑点，被白色短柔毛；苞片卵形，绿色，具紫褐色斑点，长1.5—2.5 cm，宽1.5—2 cm，先端略钝，背面被短柔毛并有龙骨状突起，边缘具缘毛；花梗和子房紫褐色，长3—4.5 cm，被白色短柔毛；花1—2（—3）朵，直径5—7 cm，通常淡黄色或近黄色，罕有近象牙白色，全部具紫色细斑点；中萼片宽卵形，长2.5—4.5 cm，宽2.5—4.8 cm，先端钝或微缺，边缘具缘毛；合萼片与中萼片相似，略小；花瓣斜椭圆形，长4—5.5 cm，宽2.8—3.8 cm，先端圆或近截形；唇瓣深囊状，椭圆形至卵状椭圆形，长3.5—4.5 cm，宽1.4—1.8 cm，前端内弯边缘宽1—2 mm；退化雄蕊宽卵形至卵状三角形，长1—1.2 cm，宽0.8—1.1 cm，先端具齿或近急尖，基部边缘有时有细缘毛。 $2n=26$ 。

花期：野外为5—8月。

分布：广西西部、贵州南部、云南东南部至西南部；柬埔寨、老挝、缅甸、泰国、越南。

生境：荫蔽岩壁缝隙中或灌木丛生的山坡或疏林下多石或排水良好之地；海拔300—1400 m。

说明：同色兜兰是一个广布和极富变异的种，具有许多变型。第1型的花缺少紫色斑点（白花变型f. *album*），第2型的叶背面不具紫斑（绿叶变型f. *chlorophyllum*），第3型的花瓣较狭而长（长瓣变型f. *longipetalum*），第4型的花瓣具紫色条纹而非紫色斑点（条纹变型f. *striatum*），第5型的叶与花均无紫色斑点（硫黄变型f. *sulphurinum*），第6型的花序具4—5花（热氏变型f. *regnieri*），第7型的中萼片与花瓣较大（越北变型f. *tonkinense*）。事实上，其中有些原来是作为亚种的，有些则作为变种或变型。虽然我们未曾看到这些种下等级，但对一个广布的、在叶的斑纹

和花的色泽变异甚大的种做过分细致的划分未必是明智的。当然，正如P. J. Cribb (1998) 所建议的那样，其中有些是可以作为变型处理的。在中国，有2个变种描述于2000年：无点变种 (var. *immaculatum*) 事实上就是白花变型 (f. *album*) 的异名，而另一个变种大化变种 (var. *dahuaense*) 看来是一个有区别特征的实体。后者的花没有斑点，而叶的背面则密布紫色斑点。P. J. Cribb (1988) 曾建议在同色兜兰中所有的色泽变异，包括花与叶的色泽变异，均应作为变型处理。这或许是最恰当的选择。本书将大化变种降为变型。

Terrestrial or lithophytic plants. Leaves 4–7, oblong to narrowly elliptic, 8–16 cm long, 3–5.2 cm wide, coriaceous, rounded and bilobulate at apex, adaxially tessellated with dark green and whitish or light green, abaxially densely spotted with purple or almost entirely purple. Scape suberect, 7–10 cm long, green heavily and finely spotted with purple-brown, white-pubescent; bract ovate, green finely spotted with purple-brown, 1.5–2.5 cm long, 1.5–2 cm wide, apex subobtusate, abaxially pubescent, ciliate; pedicel and ovary purple-brown, 3–4.5 cm long, white-pubescent; flowers 1–2(–3), 5–7 cm across, usually pale yellow or yellowish, rarely ivory-white, finely spotted with purple or brown-purple throughout; dorsal sepal broadly ovate, 2.5–4.5 cm long, 2.5–4.8 cm wide, obtuse to retuse at apex, ciliate; synsepal similar to dorsal sepal, slightly smaller; petals obliquely elliptic, 4–5.5 cm long, 2.8–3.8 cm wide, rounded or subtruncate at apex; lip deep pouched, ellipsoid to ovoid-ellipsoid, 3.5–4.5 cm long, 1.4–1.8 cm wide, with incurved margins 1–2 mm broad apically; staminode broadly ovate to ovate-triangular, 10–12 mm long, 8–11 mm wide, toothed to subacute apically, sometimes minutely ciliate on basal margins. $2n=26$.

Flowering period: May to August in the wild.

Distribution: W Guangxi, S Guizhou, SE to SW Yunnan; Cambodia, Laos, Myanmar, Thailand, Vietnam.

Habitat: In crevices of shady cliffs or rocky and well-drained places on shrubby slopes or in open forests in limestone areas at an elevation between 300 and 1400 m.

Note: A widespread and very variable species with many forms. The first form lacks purple spots on the flowers (f. *album*), the second lacks purple markings on the abaxial surface of the leaves (f. *chlorophyllum*), the third has narrower and longer petals (f. *longipetalum*), the fourth has purple-streaked rather than purple-spotted petals (f. *striatum*), the fifth lacks purple spots on both flowers and leaves (f. *sulphurinum*), the sixth has a 4- or 5-flowered inflorescence (f. *regneri*) and the seventh has a larger dorsal sepal and petals (f. *tonkinense*), of which, in fact, some were treated as subspecies, and others as varieties or forms originally. Although we have not seen any of them, it does not seem necessarily intelligent to make such an overdetailed classification for a widespread species of great variation in leaf markings and flower coloring. Some of them, of course, can be treated as forms, as suggested by P. J. Cribb (1998). In China, two varieties were described in 2000.

One, var. *immaculatum*, is in fact a synonym of f. *album*, and the other, var. *dahuaense*, appears to be a distinct entity. The flowers of the latter are spotless and leaves densely purple-spotted on abaxial surface. This variety is reduced here to a form as follows.

大化兜兰（变型）（图5-30, 31）（Fig. 5-30, 31）

Paphiopedilum concolor f. **dahuaense** (Z. J. Liu & J. Yong Zhang) Z. J. Liu & S. C. Chen, stat. nov. **Type:** China, Guangxi, Dahua, cult., Z. J. Liu 1521 (holotype, NOCC!).

Paphiopedilum concolor var. *dahuaense* Z. J. Liu & J. Yong Zhang in Acta Bot. Yunnan, 22 (4): 393. 2000.

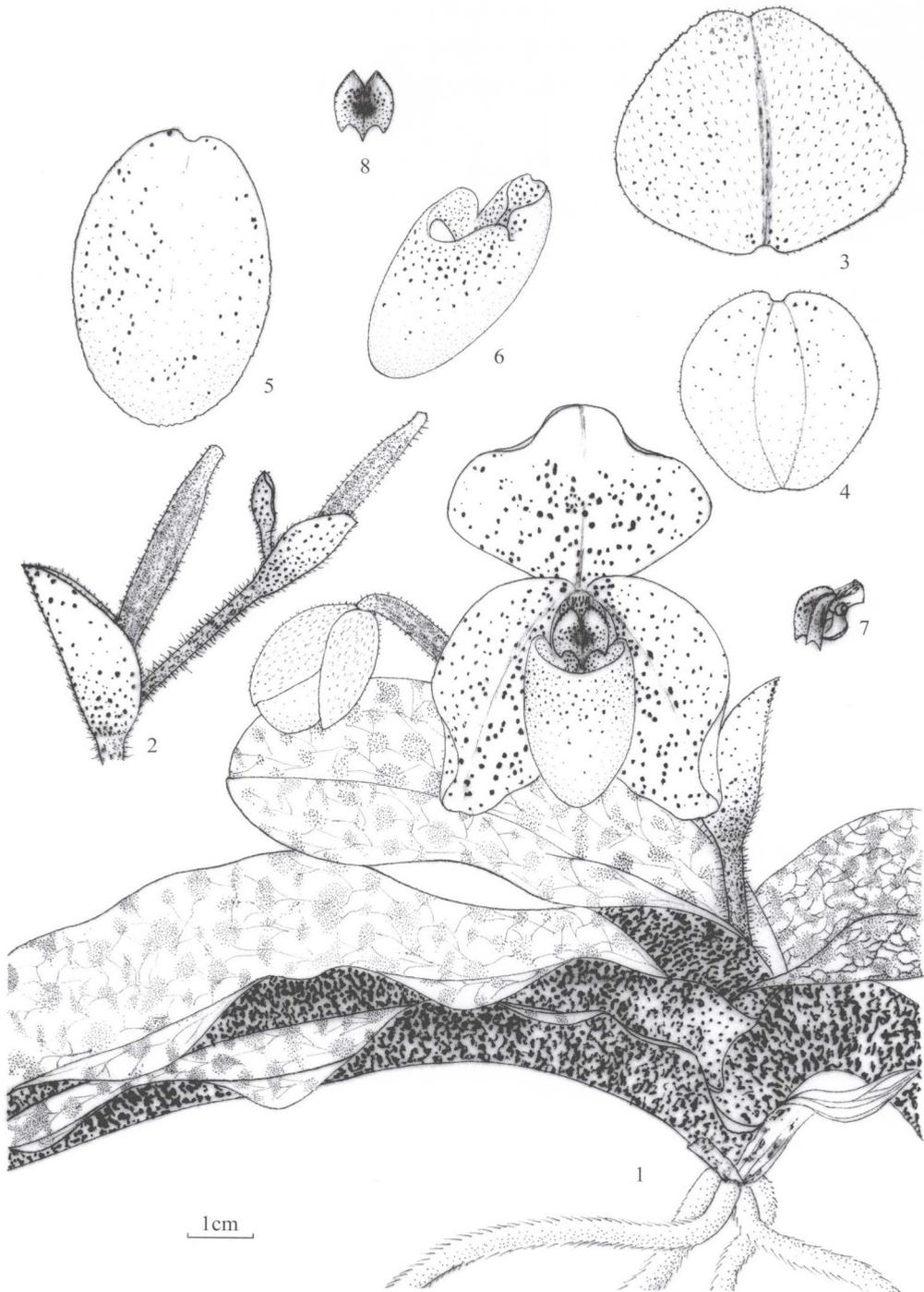


图 5-27. 同色兜兰: 1. 带花植株; 2. 苞片和子房; 3. 中萼片, 背面观; 4. 合萼片, 背面观; 5. 花瓣; 6. 唇瓣, 侧面观; 7. 蕊柱; 8. 退化雄蕊

Fig. 5-27. *Paphiopedilum concolor*: 1. Flowering plant; 2. Bract and ovary; 3. Dorsal sepal, back view; 4. Synsepal, back view; 5. Petal; 6. Lip, side view; 7. Column; 8. Staminode



图 5-28. 同色兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-28. *Paphiopedilum concolor*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan



图 5-29. 同色兜兰: a, b. 在广西北部野外开花; c, d. 在栽培中开花

Fig. 5-29. *Paphiopedilum concolor*: a, b. Flowering in the wild in western Guangxi; c, d. Flowering in cultivation



图版 6. 同色兜兰
Plate 6. *Paphiopedilum concolor*

油画 作者: 李丝云
Oil painting by Si -yun Li

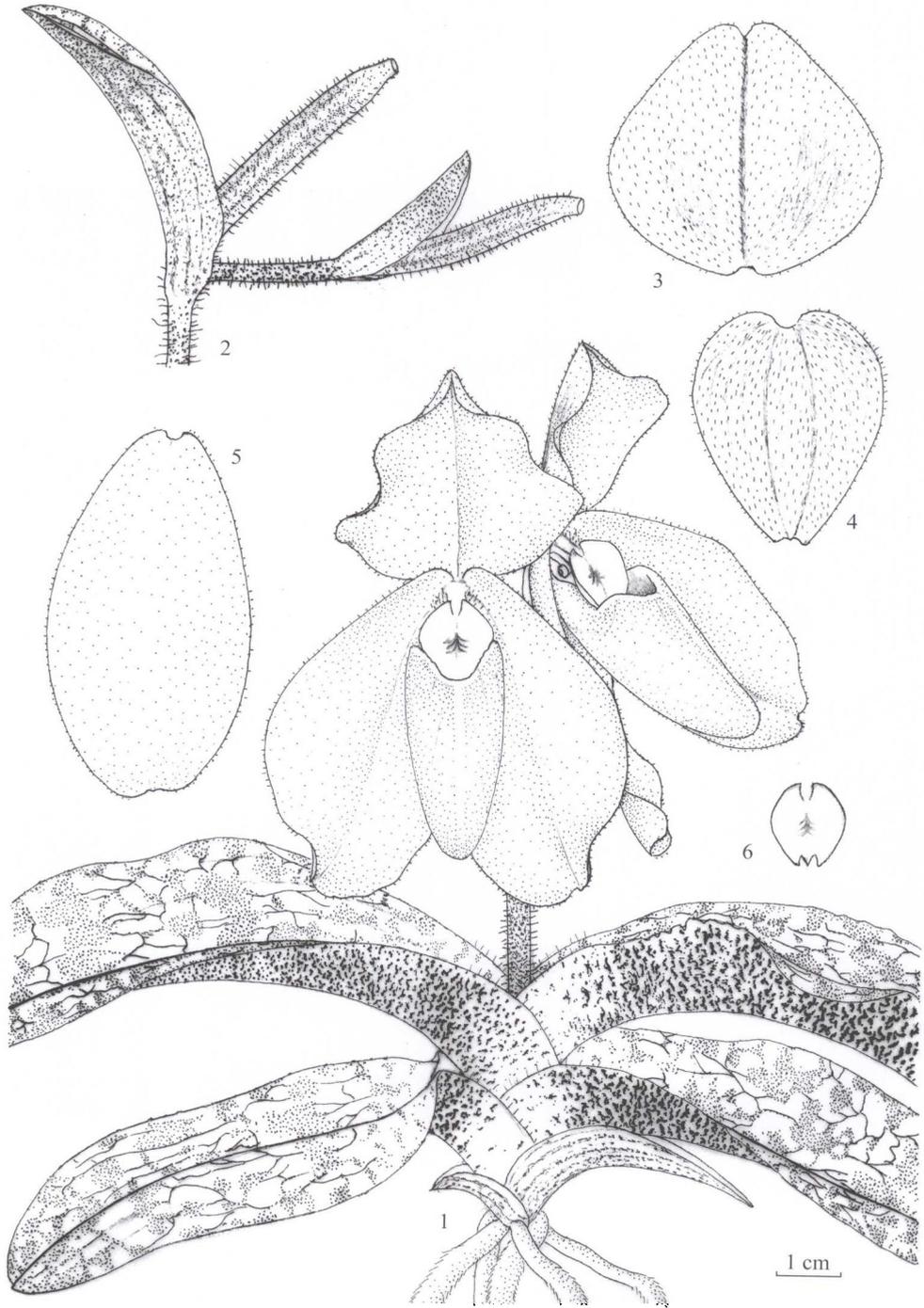


图 5-30.大化兜兰(变型): 1. 带花植株; 2. 苞片和子房; 3. 中萼片, 背面观; 4. 合萼片, 背面观; 5. 花瓣; 6. 退化雄蕊

Fig. 5-30. *Paphiopedilum concolor* f. *dahuaense*: 1. Flowering plant; 2. Bracts and ovaries; 3. Dorsal sepal, back view; 4. Synsepal, back view; 5. Petal; 6. Staminode



图 5-31.大化兜兰（变型）：a-d. 在栽培中开花

Fig. 5-31. *Paphiopedilum concolor* f. *dahuaense*: a-d. Flowering in cultivation

8. 巨瓣兜兰 (图5-32, 33, 34; 图版7) (Fig. 5-32, 33, 34; Pl. 7)

Paphiopedilum bellatulum (Rchb. f.) Stein, Orchideenbuch: 456. 1892; Pfitzer in Bot. Jahrb. Syst. 19: 40. 1894, et in Engler, Pflanzenreich IV(50) Heft 12: 55. 1903; P. J. Cribb in Curtis's Bot. Mag. 84: t. 880. 1983, Gen. Paphiopedilum: 77. 1987, et Gen. Paphiopedilum (ed. 2): 105. 1998; Braem, Paphiopedilum: 44. 1988; S. C. Chen & Z. H. Tsi, Orch. China: 119. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 94. 1998; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 326. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 60. 1999. **Type:** Myanmar, hort. Low s. n. (holotype, W).

Cypripedium bellatulum Rchb. f. in Gard. Chron. ser. 3, 3: 648, 746. 1888.

Cordula bellatula (Rchb. f.) Rolfe in Orchid Rev. 20: 2. 1912.

地生植物。叶4—5枚，二列，矩圆状椭圆形或狭椭圆形，长10—18 cm，宽3.5—6 cm，先端急尖或钝并有不对称的2浅裂，上面有深浅绿色相间的网格斑或有时略有带乳白色的绿色斑，背面密布紫色斑点。花葶近直立或外弯，长3—7 cm，淡绿色，密布紫色斑点，具白色长柔毛；苞片卵形或椭圆形，绿色而有紫色斑点，长2.2—3 cm，宽1.5—2 cm，先端急尖，边缘具细缘毛；花梗和子房长3—3.5 cm，被白色短柔毛；花1朵或罕有2朵，直径5—8 cm，白色或象牙白色，罕有淡黄白色；中萼片与花瓣具紫红色或紫褐色粗斑点，粗斑点直径达1.5—2 mm；合萼片、唇瓣和退化雄蕊上具细斑点；中萼片横椭圆形至宽卵形，稍凹陷，长3—3.5 cm，宽3.5—5 cm，先端浑圆或钝并有短尖头或微凹；合萼片卵圆形，长2—2.5 cm，宽2.5—3 cm，边缘有细缘毛；花瓣宽椭圆形或宽卵状椭圆形，长4.5—6 cm，宽3—5 cm，先端浑圆，上面基部具毛，边缘有细缘毛；唇瓣深囊状，椭圆形，有时向末端稍变狭，长2.5—4 cm，宽1.5—2 cm，前端边缘内弯约1—2 mm；退化雄蕊近圆形或略带方形，长8—11 mm，宽8—9 mm，中央具淡黄色晕，先端钝或近截形并略有3齿。2n=26。

花期：野外为4—6月。

分布：广西西部、云南东南部至西部；缅甸、泰国。

生境：石灰岩地区稍荫蔽和覆盖腐殖质的岩壁上或灌木丛生的山坡和疏林下多石和排水良好处；海拔1000—1800 m。

说明：该种之下有一个白化型，即白花变型[f. *album* (O'Brien) Braem]，发表于1998年。

此外，被报告发现于中国的*P. godefroyae*和*P. conco-bellatulum* (陈心启和刘芳媛, 1982; Mark, 1987) 实际上都是同色兜兰 (*P. concolor*) 和巨瓣兜兰的天然杂种。这两个种的分布、海拔和花期都有重叠，在云南东南部可以看到多种多样的天然杂种。它们常常被错误鉴定。

Terrestrial plants. Leaves 4–5, distichous, oblong-elliptic or narrowly elliptic, 10–18 cm long, 3.5–6 cm wide, acute or obtuse and unequally bilobulate at apex, adaxially tessellated with dark and pale green or sometimes slightly mottled with whitish-green, abaxially

heavily purple-spotted. Scape suberect or arching, 3–7 cm long, pale green densely spotted with purple, white-villose; bract ovate or elliptic, green spotted with purple, 2.2–3 cm long, 1.5–2 cm wide, acute at apex, minutely ciliate; pedicel and ovary 3–3.5 cm long, white-pubescent; flower single or rarely 2, 5–8 cm across, white or ivory, rarely pale yellow-white, with large maroon or purple-brown spots up to 1.5–2 mm in diam. on dorsal sepal and petals and smaller spots on synsepal, lip and staminode; dorsal sepal transversely elliptic to broadly ovate, slightly concave, 3–3.5 cm long, 3.5–5 cm wide, rounded, slightly mucronate or retuse at apex, minutely ciliate; synsepal ovate-orbicular, concave, 2–2.5 cm long, 2.5–3 cm wide, minutely ciliate; petals broadly elliptic or broadly ovate-elliptic, 4.5–6 cm long, 3–5 cm wide, rounded at apex, hairy toward adaxial base, minutely ciliate; lip deep pouched, ellipsoid, usually 2.5–4 cm long, 1.5–2 cm wide, with incurved margins 1–2 mm wide apically; staminode suborbicular or subsquare, 8–11 mm long, 8–9 mm wide, apex obtuse or subtruncate, usually slightly tridenticulate. $2n=26$.

Flowering period: April to June in the wild.

Distribution: W Guangxi, SE to W Yunnan; Myanmar, Thailand.

Habitat: On slightly shaded and humus-covered cliffs or on rocky and well-drained places on shrubby slopes or in open forests in limestone areas at an altitude between 1000 and 1800 m.

Note: An albino form of this species was described in 1998: *f. album* (O' Brien) Braem.

In addition, *P. godefroyae* (God.-Leb.) Stein and *P. concolor-bellatulum* Hort. reported from China (Chen & Liu, 1982; Mark, 1987) are in fact both natural hybrids between *P. concolor* and *P. bellatulum*. The latter two species have an overlapping distribution, altitude and anthesis, and a wide diversity of natural hybrids of them can be found in Southeast Yunnan. They were often misidentified.

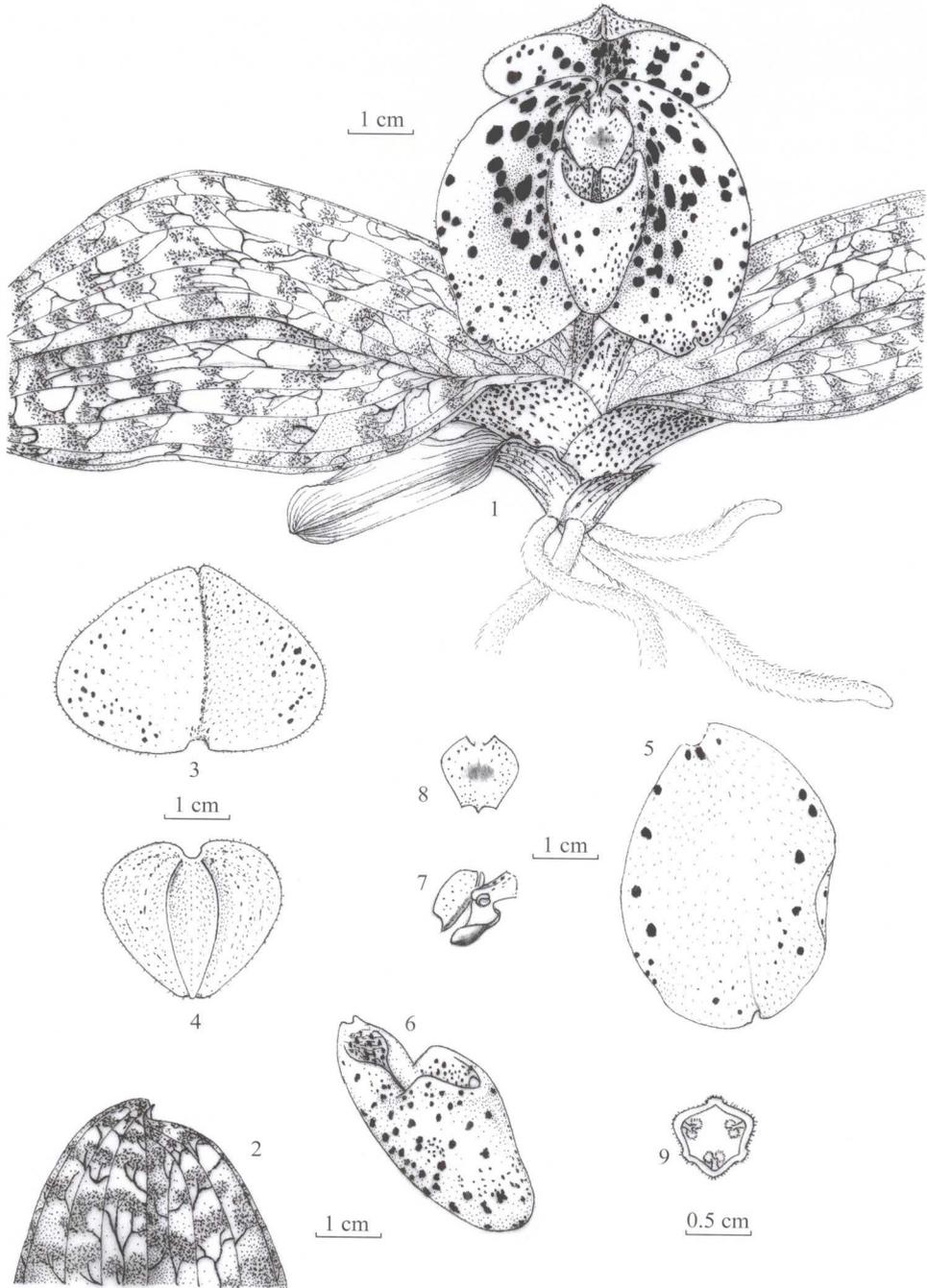


图 5-32. 巨瓣兜兰: 1. 带花植株; 2. 叶的先端部分; 3. 中萼片, 背面观; 4. 合萼片, 背面观; 5. 花瓣, 背面观; 6. 唇瓣, 侧面观; 7. 蕊柱; 8. 退化雄蕊; 9. 子房横切面

Fig. 5-32. *Paphiopedilum bellatulum*: 1. Flowering plant; 2. Apical part of a leaf; 3. Dorsal sepal, back view; 4. Synsepal, back view; 5. Petal, back view; 6. Lip, side view; 7. Column; 8. Staminode; 9. Ovary cross section



图 5-33. 巨瓣兜兰: a. 在云南西部的自然生境; b. 在云南西部野外开花
Fig. 5-33. *Paphiopedilum bellatulum*: a. Its natural habitat in western Yunnan; b. Flowering in the wild in western Yunnan



图 5-34. 巨瓣兜兰: a-c. 在广西北部野外开花; d. 在栽培中开花
Fig. 5-34. *Paphiopedilum bellatulum*: a-c. Flowering in the wild in western Guangxi; d. Flowering in cultivation



图版 7. 巨瓣兜兰
Plate 7. *Paphiopedilum bellatulum*

油画 作者: 李丝云
Oil painting by Si -yun Li

9. 文山兜兰 (图5-35, 36, 37) (Fig. 5-35, 36, 37)

Paphiopedilum wenshanense Z. J. Liu & J. Yong Zhang in Acta Bot. Yunnan. 22 (4): 391. 2000. **Type:** China, Yunnan, Wenshan, cult., Z. J. Liu 1507 (holotype, NOCC!).

地生植物。叶4—5枚，近椭圆形，长5—10 cm，宽3.5—4.5 cm，先端钝圆并有不对称的2裂，上面有深浅绿色相间的网格斑和略带浊白色斑，背面除基部为绿色并具紫点外均呈紫色。花葶近直立，长7—10 cm，绿色并具紫褐色斑点，被短柔毛；苞片卵状椭圆形，长1.6—2 cm，宽1.5—2 cm，背面上脉上被毛，边缘具缘毛；花梗与子房长4—4.5 cm，被毛；花1—3朵，直径5—7 cm，乳白色或黄白色；中萼片与花瓣具褐红色粗斑点（斑点直径2—2.5 mm），和1条由褐红色斑点组成的中央纵条纹；合萼片、唇瓣和退化雄蕊具较细小的褐红色斑点；中萼片宽卵形至近圆形，长2.5—3 cm，宽2.5—3.5 cm，先端钝圆；合萼片卵形，明显小于中萼片，长2—2.5 cm，宽约2 cm，先端钝；花瓣宽椭圆形或矩圆状椭圆形，长3.5—4 cm，宽2.5—3 cm，先端钝，上面基部被白色长柔毛；唇瓣深囊状，椭圆形，长3.5—4 cm，宽2—2.5 cm，外表面被白色微柔毛，前端内折边缘狭窄；退化雄蕊宽椭圆形，长宽各8—9 mm，基部近心形，尾状先端长达1.5—2 mm。

花期：园中栽培为5月。

分布：云南东南部（文山县）。

生境：生于石灰岩地区有茂密灌木和草丛的山坡上；海拔1000—1200 m。

说明：此种是基于从云南东南部文山县苗圃引种的3株植物描述的。最近我们在文山镇郊区找到它，生于有茂密灌丛和草丛的山坡上。文山兜兰与其近亲巨瓣兜兰的区别点在于：前者在中萼片与花瓣上具1条由褐红色斑点组成的中央纵条纹，以及在退化雄蕊顶端有1条长1.5—2 mm的尾。此外，该种之下曾记载一个白化型，即白花变型（f. *album* Gruss & Petchl.）（2002）。

Terrestrial plants. Leaves 4–5, subelliptic, 5–10 cm long, 3.5–4.5 cm wide, obtuse-rounded and unequally bilobed at apex, adaxially tessellated with dark and pale green and more or less mottled with dull whitish, abaxially purple except for the green and purple-spotted base. Scape suberect, 7–10 cm long, green, spotted with purple-brown, pubescent; bracts ovate-elliptic, 1.6–2 cm long, 1.5–2 cm wide, hairy along abaxial midvein, ciliate; pedicel and ovary 4–4.5 cm long, hairy; flowers 1–3, 5–7 cm across, whitish or yellow-white; dorsal sepal and petals with brown-red spots 2–2.5 mm in diam. and each with a central longitudinal stripe composed of brown-red spots; synsepal, lip and staminode with smaller brown-red spots; dorsal sepal broadly ovate to suborbicular, 2.5–3 cm long, 2.5–3.5 cm wide, obtuse-rounded at apex; synsepal ovate, 2–2.5 cm long, ca. 2 cm wide, obtuse at apex; petals broadly elliptic or oblong-elliptic, 3.5–4 cm long, 2.5–3 cm wide, obtuse at apex, hairy toward adaxial base; lip deep pouched, ellipsoid, 3.5–4 cm long, 2–2.5 cm wide, white-puberulous outside, with apical margins narrowly incurved; staminode broadly elliptic, 8–9 mm long and wide, subcordate at base, with a caudate apex 1.5–2 mm long.

Flowering period: May in cultivation.

Distribution: SE Yunnan (Wenshan county).

Habitat: On densely shrubby and grassy slopes in limestone areas; alt. 1000–1200 m.

Note: This species was described based on three plants introduced from a nursery in Wenshan county of southeastern Yunnan. Recently we have found it in Wenshan suburb, growing on densely shrubby and grassy slopes. This species differs from its ally *P. bellatulum* by having a central longitudinal stripe composed of brown-red spots on dorsal sepal and petals, and a tail 1.5–2 mm long at the apex of the staminode. Besides, an albino form of this species was described in 2002: f. *album* Gruss & Petchl.

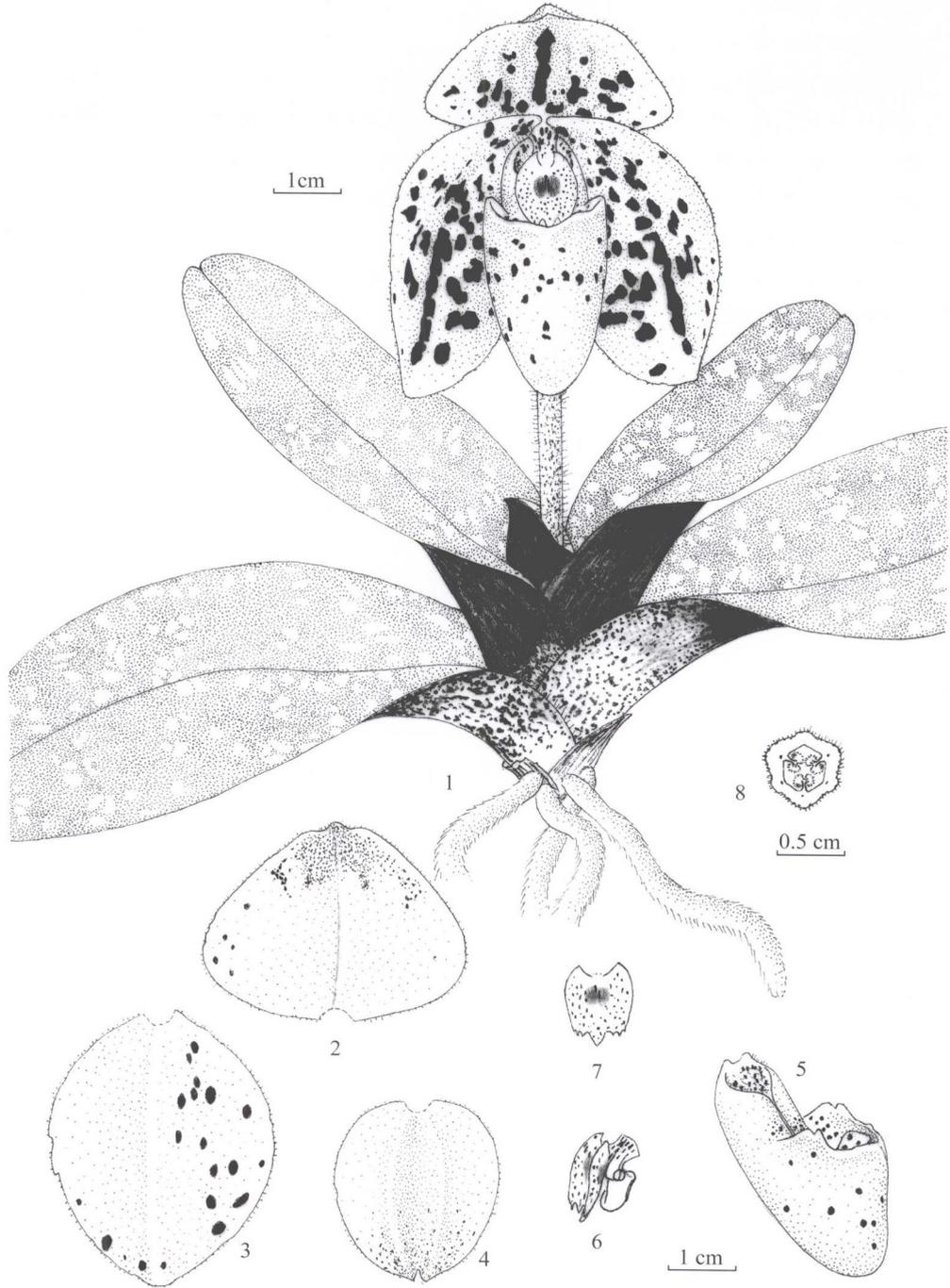


图 5-35. 文山兜兰: 1. 带花植株; 2. 中萼片, 背面观; 3. 花瓣, 背面观; 4. 合萼片, 背面观; 5. 唇瓣, 侧面观; 6. 蕊柱, 侧面观; 7. 退化雄蕊, 正面观; 8. 子房横切面
 Fig. 5-35. *Paphiopedilum wenshanense*: 1. Flowering plant; 2. Dorsal sepal, back view; 3. Petal, back view; 4. Synsepal, back view; 5. Lip, side view; 6. Column, side view; 7. Staminode, front view; 8. Ovary cross section

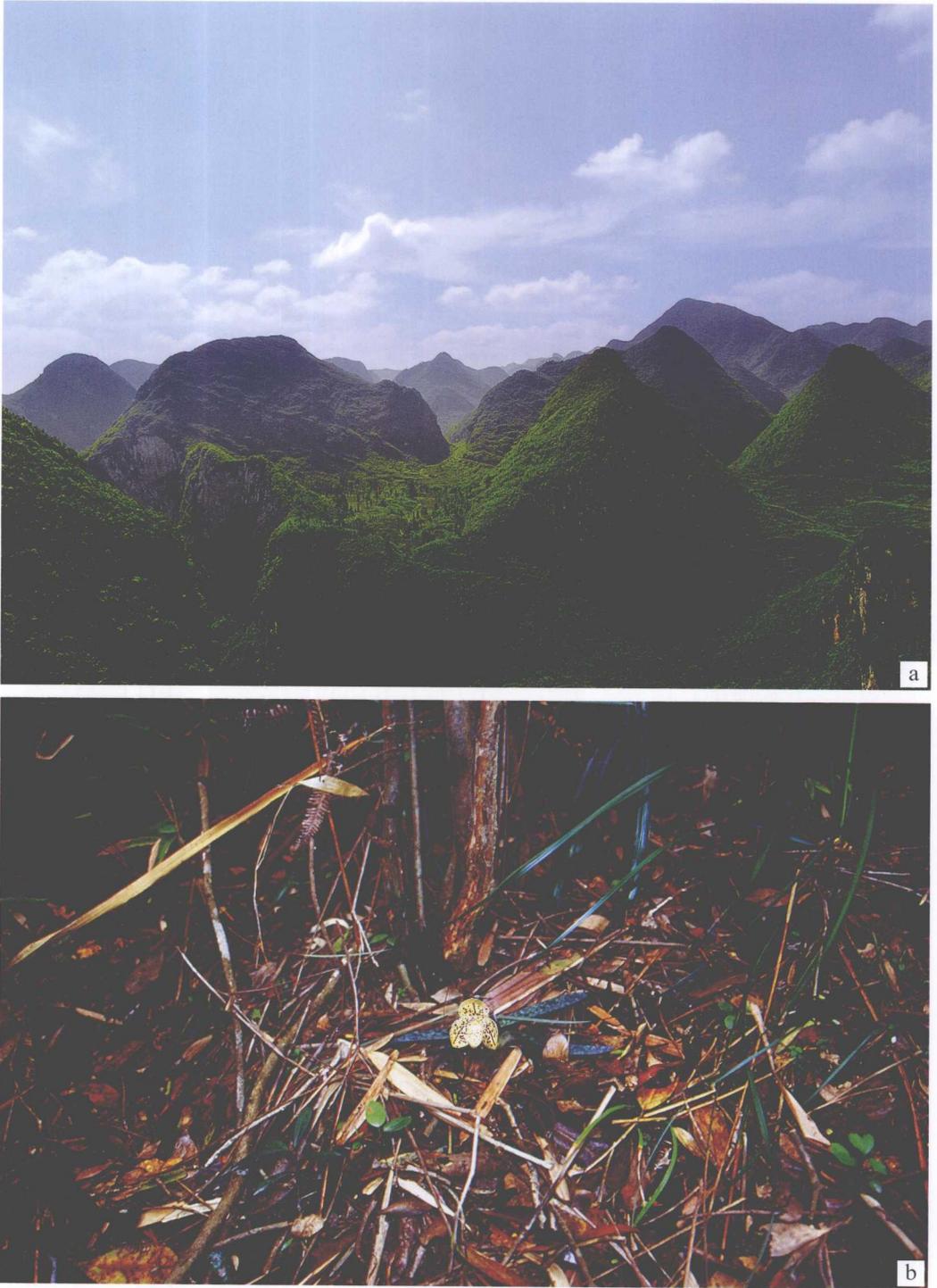


图 5-36. 文山兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-36. *Paphiopedilum wenshanense*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan



图 5-37. 文山兜兰: a-c. 在栽培中开花
Fig. 5-37. *Paphiopedilum wenshanense*: a-c. Flowering in cultivation

10. 带叶兜兰 (图5-38, 39, 40, 41; 图版8) (Fig. 5-38, 39, 40, 41; Pl. 8)

Paphiopedilum hirsutissimum (Lindl. ex Hook.) Stein, Orchideenbuch: 470. 1892; Pfitzer in Bot. Jahrb. Syst. 19: 41. 1894, et in Engler, Pflanzenreich IV(50) Heft 12: 69. 1903; K. Y. Lang & Z. H. Tsi in Icon. Cormoph. Sin. 5: 610, t. 8049. 1976; U. Pradhan, Indian Orchids 1: 39. 1976; P. J. Cribb, Gen. Paphiopedilum: 138. 1987, et Gen. Paphiopedilum (ed. 2): 220. 1998; Braem, Paphiopedilum: 125. 1988; S. C. Chen & Z. H. Tsi, Orch. China: 122. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 258. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 332. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 62. 1999. **Type:** India, cult. Parker (holotype, K!).

Cypripedium hirsutissimum Lindl. ex Hook. in Curtis's Bot. Mag. 83: t. 4990. 1857.

Cordula hirsutissima (Lindl. ex Hook.) Rolfe in Orchid Rev. 20: 2. 1912.

Paphiopedilum esquirolei Schltr. in Fedde Repert. Sp. Nov. Beih. 4: 39. 1919. **Type:** China, Guizhou, Esquirol 3277 (holotype, B†; isotype, P!).

Cordula esquirolei (Schltr.) Hu in Rhodora 27: 105. 1925.

Paphiopedilum chiwuanum T. Tang & F. T. Wang in Acta Phytotax. 1(1): 56. 1951. **Type:** China, southeastern Yunnan, C. W. Wang 88252 (holotype, PE!).

Paphiopedilum hirsutissimum var. *esquirolei* (Schltr.) Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 40. 1982; P. J. Cribb, Gen. Paphiopedilum (ed. 2): 225. 1998; Aver. et al., Slipper Orch. Vietnam: 159. 2003.

Paphiopedilum hirsutissimum var. *chiwuanum* (T. Tang & F. T. Wang) P. J. Cribb, Gen. Paphiopedilum: 140. 1987; Aver. et al., Slipper Orch. Vietnam: 166. 2003.

Paphiopedilum saccopetalum S. Hua Hu in Die Orchidee 49 (1): 38. 1998. **Type:** China, Guangxi, cult. M. H. Chao (holotype, IBSC).

Paphiopedilum esquirolei Schltr. var. *chiwuanum* (T. Tang & F. T. Wang) Braem & Chiron, Paphiopedilum: 181. 2003.

地生或石上附生植物。叶4—6枚，带形或线形，长23—44 cm，宽1.4—2.2 cm，先端渐尖并常有3小齿，上面绿色至深绿色，背面淡绿色或在基部偶见有紫色斑点。花葶近直立或外弯，长20—30 cm，被深紫色长柔毛，基部有长鞘；苞片卵状椭圆形，长1—1.8（—2.6）cm，背面被密毛，边缘具长缘毛；花梗和子房长4—7 cm，具6纵棱，棱上密被深紫色长毛；花单朵，初开时较小，花瓣较短而且边缘不为波状，尔后花增大，尤其花瓣显著增长而且下半部边缘强烈波状，在花完全开放时，直径9—13 cm；中萼片和合萼片除边缘淡绿黄色外，中央至基部紫褐色；花瓣下半部淡黄绿色至黄绿色而有浓密的紫褐色细斑点，上半部玫瑰紫色；唇瓣淡黄绿色而有紫褐色小斑点；退化雄蕊紫褐色，具浅黄色边缘，基部有2个绿白色大斑点，从中央至先端处有1个淡黄绿色斑块；中萼片宽卵形或卵状椭圆形，长3.5—4.4 cm，宽3.3—3.7 cm，先端钝或微缺，边缘波状并具缘毛；合萼片与中萼片相似，略狭窄；花瓣匙

形，长6—8 cm，宽1.5—2.5 cm，先端浑圆或近截形；下部边缘呈强烈波浪状；两面均疏被短柔毛，边缘具缘毛；唇瓣盔状；囊椭圆状卵形，长2.5—3.5 cm，宽2—2.5 cm，囊口两侧呈耳状；退化雄蕊近正方形，长与宽各8—10 mm，凸起，先端钝。 $2n=26$ 。

花期：野外为4—5月。

分布：广西北部至西部、贵州西南部、云南东南部；印度东北部、老挝、缅甸、泰国北部、越南北部。

生境：石灰岩地区荫蔽岩壁缝隙中、常绿阔叶林或灌丛中多石与排水良好之地或岩石上；海拔300—1500 m。

说明：这是一个变异幅度很大的种，尤其在花的结构上更是如此。例如，陈心启在巴黎看到的*P. esquirolei* 副模式标本（Esquirol 3277），其花的直径小于10 cm，花序柄上具长达2—3 mm的长毛。我们在云南省南部的麻栗坡看到数百株开花的个体，在开花初期花瓣短而且边缘非波状，但后来延长并在下半部变为强烈的波状。花的大小甚至在同一个居群中也有很大的变化。故我们将两个变种予以归并。

该种与波瓣兜兰复合体（*P. insigne complex*）（可能是巧花兜兰*P. helenae*）之间的天然杂种：禾曼兜兰（杂种）（*Paphiopedilum* × *herrmannii* F. Fuchs & H. Reisinger）[in *Linzer Biol. Beitr.* 27 (2): 1213. 1995]发现于越南。此外，该种之下有一个白化型，即绿花变型（f. *viride* Gruss & Roeth），发表于1999年。

Terrestrial or lithophytic plants. Leaves 4–6, lorate or linear, 23–44 cm long, 1.4–2.2 cm wide, usually acuminate and tridenticulate at apex, adaxially dark green, abaxially paler and occasionally spotted with purple at base. Scape suberect or arching, 20–30 cm long, covered with deep purple long hairs, basally subtended by a long sheath; bract ovate-elliptic, 1–1.8 (–2.6) cm long, abaxially densely hairy, long-ciliate; pedicel and ovary 4–7 cm long, 6-ribbed, densely covered with deep purple long hairs along ribs; flower single, initially rather small with shorter petals not undulate-margined and then becoming larger with petals conspicuously elongating and strongly undulate along basal margins, reaching 9–13 cm across in full bloom; dorsal sepal and synsepal dark brown, with pale yellow-green margins; petals pale yellow and densely and finely spotted with purple-brown in basal half, purplish-rose in apical half; lip pale yellow-green densely and finely spotted with purple-brown; staminode purple-brown with pale yellow margins and two large green-white spots basally and a pale yellow blotch centrally; dorsal sepal broadly ovate or ovate-elliptic, 3.5–4.4 cm long, 3.3–3.7 cm wide, obtuse or emarginate at apex, undulate-margined, ciliate; synsepal similar to dorsal sepal, slightly narrower; petals spatulate, 6–8 cm long, 1.5–2.5 cm wide, rounded or subtruncate at apex, undulate-margined in basal half, slightly or scarcely puberulous on both surface, ciliate; lip helmet-shaped; pouch ellipsoid-ovoid, 2.5–3.5 cm long, 2–2.5 cm wide, auriculate on both sides of its mouth; staminode subsquare, 8–10 mm long and wide, convex, obtuse at apex. $2n=26$.

Flowering period: April and May in the wild.

Distribution: N to W Guangxi, SW Guizhou, SE Yunnan; NE India, Laos, Myanmar, N Thailand, N Vietnam.

Habitat: In crevices on shady cliffs, in rocky and well-strained places or on rocks in evergreen broad-leaved forests or thickets in limestone areas at elevations of 300–1500 m.

Note: This is a highly variable species especially in its floral structure. For example, the isotype specimen (Esquirol 3277) of *Paphiopedilum esquirolei* Schltr. examined by S. C. Chen in Paris (P) is a plant with its flower less than 10 cm across and its peduncle covered with long hairs up to 2–3 mm long. Hundreds of flowering individuals of this species have been seen in the wild in Malipo county of southeastern Yunnan. They all had short and not undulate-margined petals at the beginning, and then the petals elongated and became strongly undulate along their basal margins. The size of the flowers also varied widely from plant to plant even in the same population. So we relegate here var. *esquirolei* and var. *chiwuanum* to synonymy of *P. hirsutissimum*.

Paphiopedilum × *herrmannii* F. Fuchs & H. Reisinger [in Linzer Biol. Beitr. 27 (2): 1213. 1995], a natural hybrid of this species and *P. insigne complex*, probably *P. helenae*, was described from Vietnam. Besides, an albino form of this species, f. *viride* Gruss & Roeth, was described in 1999.

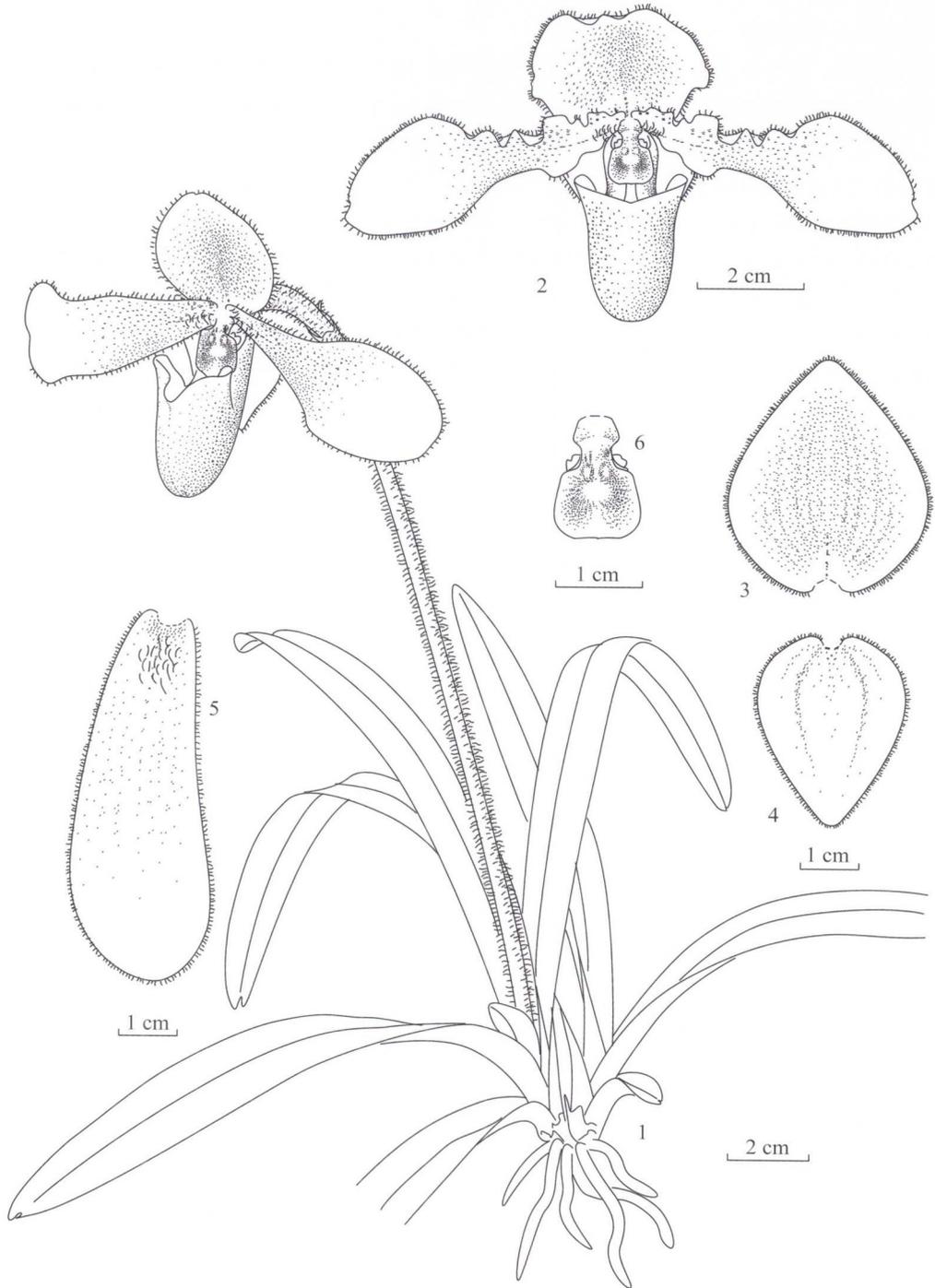


图 5-38. 带叶兜兰: 1. 带花植株; 2. 花; 3. 中萼片; 4. 合萼片; 5. 花瓣; 6. 蕊柱, 正面观
Fig. 5-38. *Paphiopedilum hirsutissimum*: 1. Flowering plant; 2. Flower; 3. Dorsal sepal; 4. Synsepal;
5. Petal; 6. Column, front view



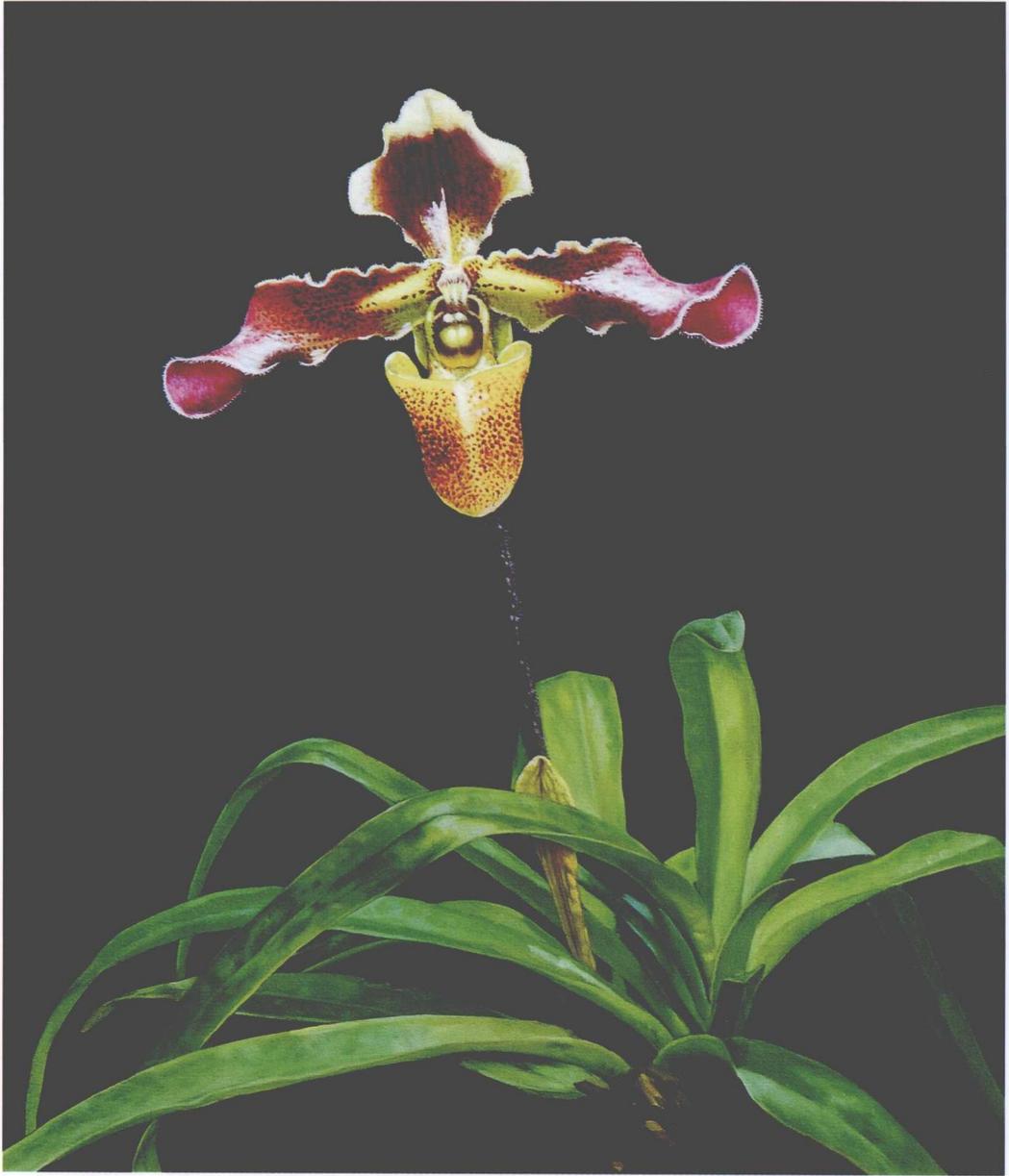
图 5-39. 带叶兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-39. *Paphiopedilum hirsutissimum*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan



图 5-40. 带叶兜兰: a. 在云南东南部野外开花; b. 在栽培中开花
Fig. 5-40. *Paphiopedilum hirsutissimum*: a. Flowering in the wild in Southeast Yunnan; b. Flowering in cultivation



图 5-41. 带叶兜兰: a-h. 同一朵花从花蕾到接近凋谢的形态变化
Fig. 5-41. *Paphiopedilum hirsutissimum*: a-h. Morphological variation of the same flower: from a bud to a somewhat withered flower



图版 8. 带叶兜兰
Plate 8. *Paphiopedilum hirsutissimum*

油画 作者: 李丝云
Oil painting by Si -yun Li

11. 红旗兜兰 (图5-42, 43, 44; 图版9) (Fig. 5-42, 43, 44; Pl. 9)

Paphiopedilum charlesworthii (Rolfe) Pfitzer in Bot. Jahrb. Syst. 19: 40. 1894, et in Engler, Pflanzenreich IV (50) Heft 12: 75. 1903; P. J. Cribb, Gen. Paphiopedilum: 142. 1987, et Gen. Paphiopedilum (ed. 2): 226. 1988; Braem, Paphiopedilum: 108. 1988; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 198. 1999. **Type:** Myanmar, hort. Charlesworth, Schuttleworth & Co. (holotype, K!).

Cypripedium charlesworthii Rolfe in Orchid Rev. 1: 303. 1893.

Cordula charlesworthii (Rolfe) Rolfe in Orchid Rev. 20: 2. 1912.

地生植物。叶3—5枚，二列，狭矩圆形，长8—20 cm，宽1.7—2.5 cm，先端急尖并有不对称的3小齿，上面深绿色，背面淡绿色且在近基部处有密集的紫褐色斑点。花葶直立，长8—16 cm，绿色，有紫褐色斑纹和微柔毛；苞片椭圆状卵形，长2.1—2.8 cm，绿色，有深紫色斑点或斑块；花梗和子房长2.9—3.4 cm，有紫褐色斑点且密被短柔毛；花单朵，直径6—8 cm；中萼片粉红色或粉红白色，有深色脉纹；合萼片淡绿色，有淡褐色脉纹；花瓣与唇瓣浅绿黄色，有褐色网状脉纹；退化雄蕊白色；中萼片直立，近圆形或横椭圆形，长3.9—4.6 cm，宽4.5—5.9 cm，有细缘毛，上面近基部有紫毛，背面被微柔毛；合萼片卵形，长3—3.5 cm，宽1.6—2.3 cm，背面密生短柔毛；花瓣矩圆状匙形，长3.8—4.4 cm，宽1.3—1.6 cm，基部有深紫色长柔毛，边缘波状且具缘毛；唇瓣盔状；囊近椭圆状卵形，长2—3 cm，宽2—2.4 cm，囊口两侧呈耳状；退化雄蕊倒卵形，长9—10 mm，宽8—9 mm，中央有黄色脐状突起。 $2n=26$ 。

花期：野外为9—10月。

分布：云南西南部至西北部（保山市、临沧县和贡山县）；印度、缅甸、泰国。

生境：生于常绿阔叶林下或石缝积土处；海拔1300—1600 m。

说明：该种之下有一个白化型，即散氏变型（f. *sadowiae* Braem）[syn.: f. *crawshawiae* (O'Brien) Gruss; basionym: *Cypripedium crawshawiae* O'Brien]，发表于1998年。

Terrestrial plants. Leaves 3–5, distichous, linear-oblong, 8–20 cm long, 1.7–2.5 cm wide, acute and unequally trilobulate at apex, adaxially uniformly green, abaxially pale green and spotted with purple-brown toward the base. Scape erect, 8–16 cm long, green mottled with purple-brown, puberulous; bract elliptic-obovate, 2.1–2.8 cm long, green spotted or mottled with deep purple; pedicel and ovary 2.9–3.4 cm long, spotted with purple-brown, densely pubescent; flower single, 6–8 cm across; dorsal sepal pink or pink-whitish, with darker veins; synsepal pale green, veined with pale brown; petals and lip pale green-yellow, with brown-reticulate venation; staminode white; dorsal sepal erect, suborbicular to transversely elliptic, 3.9–4.6 cm long, 4.5–5.9 cm wide, minutely ciliate, adaxially purple-hairy toward the base, abaxially minutely puberulous; synsepal elliptic-ovate, 3–3.5 cm

long, 1.6–2.3 cm wide, densely puberulous abaxially; petals oblong-spatulate, 3.8–4.4 cm long, 1.3–1.6 cm wide, adaxially purple-villose toward the base, slightly ciliate; lip helmet-shaped; pouch broadly ellipsoid-ovoid, 2–3 cm long, 2–2.4 cm wide, auriculate on both sides of its mouth; staminode obovate, 9–10 mm long, 8–9 mm wide, centrally with a yellow umbo. $2n=26$.

Flowering period: September and October in the wild.

Distribution: SW to NW Yunnan (Baoshan city, Lincang county and Gongshan county); India, Myanmar, Thailand.

Habitat: In evergreen broad-leaved forests or soil-deposited crevices of rocks at an elevation of 1300–1600 m.

Note: An albino form of this species, f. *sadowiae* Braem [syn.: f. *crawshawiae* (O'Brien) Gruss; basionym: *Cypripedium crawshawiae* O'Brien], was described in 1998.

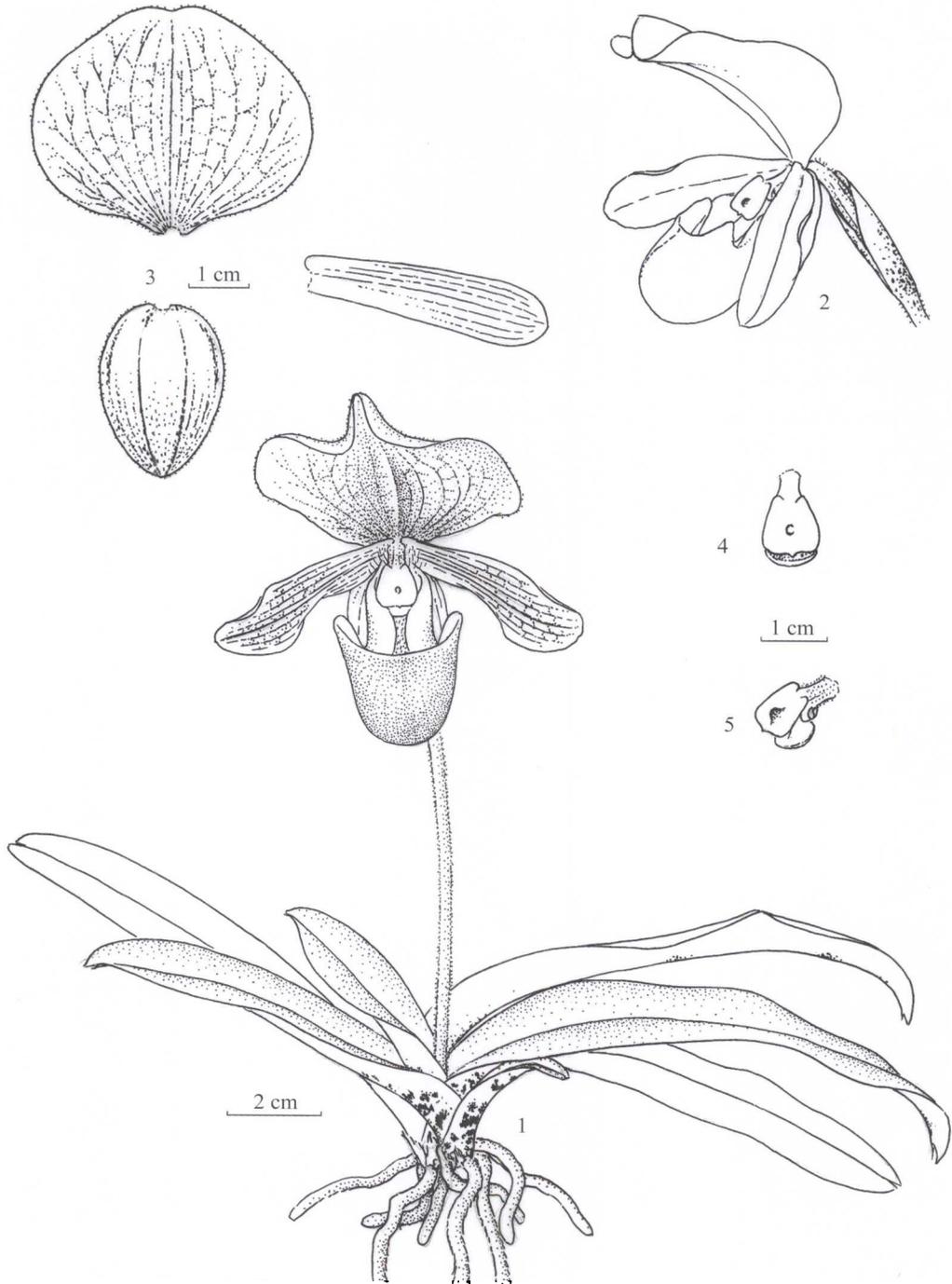


图 5-42. 红旗兜兰: 1. 带花植株; 2. 花, 侧面观; 3. 中萼片、花瓣与合萼片; 4. 蕊柱, 正面观; 5. 蕊柱, 侧面观

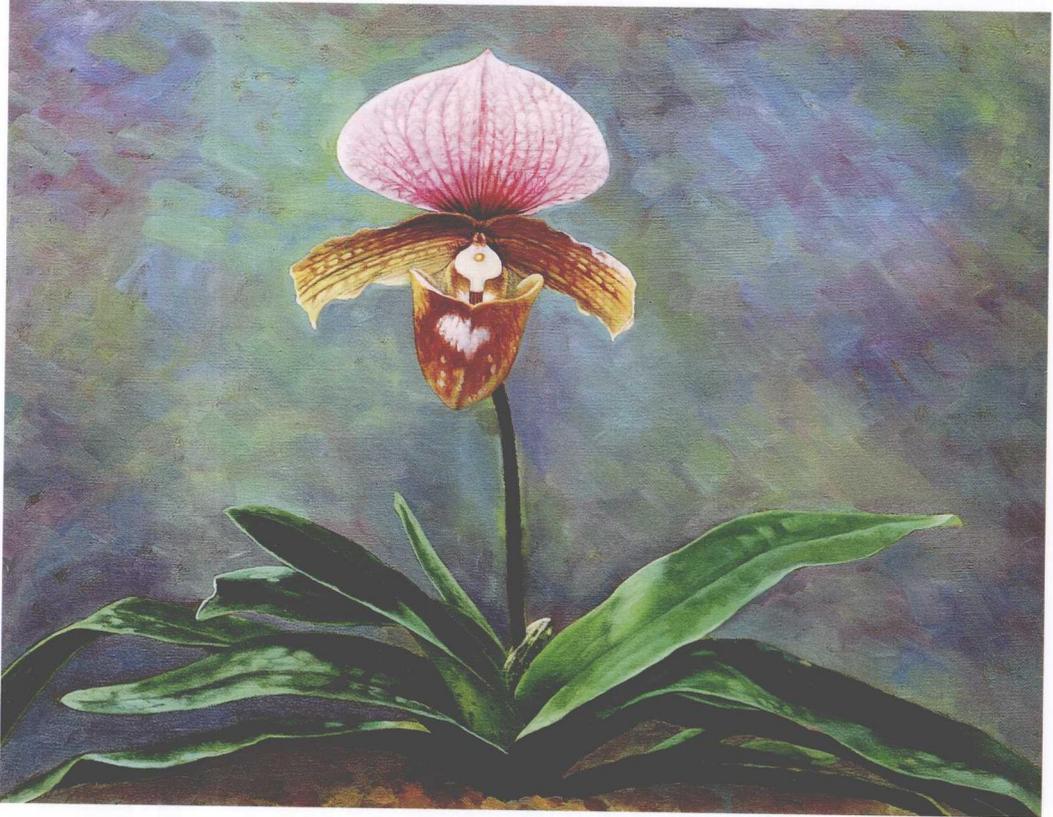
Fig. 5-42. *Paphiopedilum charlesworthii*: 1. Flowering plant; 2. Flower, side view; 3. Dorsal sepal, petal and synsepal; 4. Column, front view; 5. Column, side view



图 5-43. 红旗兜兰: a. 在云南西南部的自然生境; b. 在云南西南部野外开花
Fig. 5-43. *Paphiopedilum charlesworthii*: a. Its natural habitat in Southwest Yunnan; b. Flowering in the wild in Southwest Yunnan



图 5-44. 红旗兜兰: a, b. 在云南西南部野外开花; c-e. 在栽培中开花
Fig. 5-44. *Paphiopedilum charlesworthii*: a, b. Flowering in the wild in Southwest Yunnan. c-e. Flowering in cultivation



图版 9. 红旗兜兰
Plate 9. *Paphiopedilum charlesworthii*

油画 作者: 李丝云
Oil painting by Si -yun Li

12. 波瓣兜兰 (图5-45, 46, 47) (Fig. 5-45, 46, 47)

Paphiopedilum insigne (Wall. ex Lindl.) Pfitzer, *Morph. Stud. Orchideenbl.*: 11. 1886, et in Engler & Prantl, *Nat. Pflanzenf.* 2 (6): 84. 1889; P. J. Cribb, *Gen. Paphiopedilum*: 148. 1987, et *Gen. Paphiopedilum* (ed. 2): 231. 1998; Braem, *Paphiopedilum*: 111. 1988; S. C. Chen & Z. H. Tsi, *Orch. China*: 123. 1997; Braem, C. Baker & M. Baker, *Gen. Paphiopedilum Nat. Hist. Cult.* 2: 230. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, *Native Orch. China Colour*: 333. 1999; S. C. Chen in K. Y. Lang (ed.), *Flora Reipubl. Popul. Sin.* 17: 63. 1999. **Type**: Bangladesh, Sylhet, cult. Liverpool B. G., ex Wallich 7022 (holotype & isotype, K!).

Cypripedium insigne Wall. ex Lindl., *Collect. Bot.*: t. 32. 1821, et *Gen. Sp. Orch. Pl.*: 530, 1840; Hook. in *Curtis's Bot. Mag.* 62: t. 3412. 1835.

Cordula insignis (Wall. ex Lindl.) Rafin., *Fl. Tellur.* 4: 46. 1836.

Paphiopedilum macfarlanii F. G. Mey in *Gartenflora* 83: 93. 1934. **Type**: unknown.

地生植物。叶3—6枚，革质，狭矩圆形，长18—30 cm，宽2.5—3.5 cm，先端急尖并有2浅裂，绿色，背面在近基部处有紫褐色斑点。花葶直立，长25—35 cm，绿色，具紫褐色晕，密被紫色短柔毛；苞片卵状椭圆形，长4—5 cm，宽2.9—3.3 cm，基部具紫褐色斑；花梗和子房密被紫色短柔毛，长4.8—5.6 cm；花单朵，直径7—10 cm；中萼片黄绿色，具紫褐色斑点和深色条纹，上半部常有白色宽阔边缘；合萼片黄绿色，具绿色脉，下半部具褐色细斑点；花瓣浅黄褐色，具深色脉纹；唇瓣黄绿色，具褐色晕及脉纹；退化雄蕊浅黄色；中萼片宽卵形至卵圆形，长5.8—6.2 cm，宽4.5—4.8 cm，先端钝而且边缘内弯，背面密被短柔毛；合萼片卵状椭圆形，长4.5—5.5 cm，宽1.8—3 cm，背面被短柔毛；花瓣近匙形或矩圆状匙形，长5.5—6.5 cm，宽1.2—2.2 cm，先端钝，上侧边缘波状，基部具紫色长柔毛；唇瓣盔状；囊卵形，长2.5—3.6 cm，宽2—3 cm，囊口两侧呈耳状；退化雄蕊倒卵形，长1—1.2 cm，宽0.8—1 cm，两面被褐色短柔毛，中央具1个深黄色脐状突起。 $2n=26$ 。

花期：野外为10—12月。

分布：云南西南部；孟加拉国、印度东北部。

生境：杂草丛生的多石山坡上或常绿阔叶林下多石、枯枝落叶丰富之地；海拔1200—1600 m。

说明：该种与秀丽兜兰 (*P. venustum*) 之间的天然杂种：秀波兜兰 (杂种) (*Paphiopedilum* × *venustosignae* Pradhan) (in *Indian Orchids: Guide Identif. & Cult.* 2: 675. 1979) 发现于印度。此外，波瓣兜兰之下有两个变型：散氏变型 [f. *sanderiae* (Rchb.f.) Braem] (1999) 和无点变型 [f. *sanderianum* (Rolfe) Braem] (1999)。

Terrestrial plants. Leaves 3–6, coriaceous, narrowly oblong, 18–30 cm long, 2.5–3.5 cm wide, acute and minutely bilobulate at apex, green, abaxially spotted with purple-brown toward the base. Scape erect, 25–35 cm long, green, tinged with purple-brown, densely purple-pubescent; bract ovate-elliptic, 4–5 cm long, 2.9–3.3 cm wide, purple-marked at

base; pedicel and ovary densely purple-pubescent, 4.8–5.6 cm long; flower single, 7–10 cm across; dorsal sepal yellow-green, marked with purple-brown spots and darker stripes, often broadly white-margined in apical half; synsepal yellow-green, veined with green, minutely spotted with brown in basal half; petals pale yellow-brown, with darker veins; lip yellow-green, flushed and veined with brown; staminode pale yellow; dorsal sepal broadly ovate or ovate-orbicular, 5.8–6.2 cm long, 4.5–4.8 cm wide, obtuse at apex, apical margin incurved, densely pubescent abaxially; synsepal ovate-elliptic, 4.5–5.5 cm long, 1.8–3 cm wide, pubescent abaxially; petals subspatulate or oblong-spatulate, 5.5–6.5 cm long, 1.2–2.2 cm wide, obtuse at apex, undulate on upper margins, purple-villose toward adaxial base; lip helmet-shaped; pouch ovoid, 2.5–3.6 cm long, 2–3 cm wide, auriculate on both sides of its mouth; staminode obovate, 10–12 mm long, 8–10 mm wide, purple-puberulous on both surfaces, with a deep yellow umbo centrally. $2n=26$.

Flowering period: October to December in the wild.

Distribution: SW Yunnan; Bangladesh, NE India.

Habitat: In rocky and litter-rich places on grassy and rocky slopes or in evergreen broad-leaved forests at an altitude between 1200 and 1600 m.

Note: *Paphiopedilum* × *venustoinsigne* Pradhan (in *Indian Orchids: Guide Identif. & Cult.* 2: 675. 1979), a natural hybrid of this species and *P. venustum*, was described from India. Beside, two forms of this species have been recognized: f. *sanderiae* (Rchb. f.) Braem (1999) and f. *sanderianum* (Rolfe) Braem (1999).

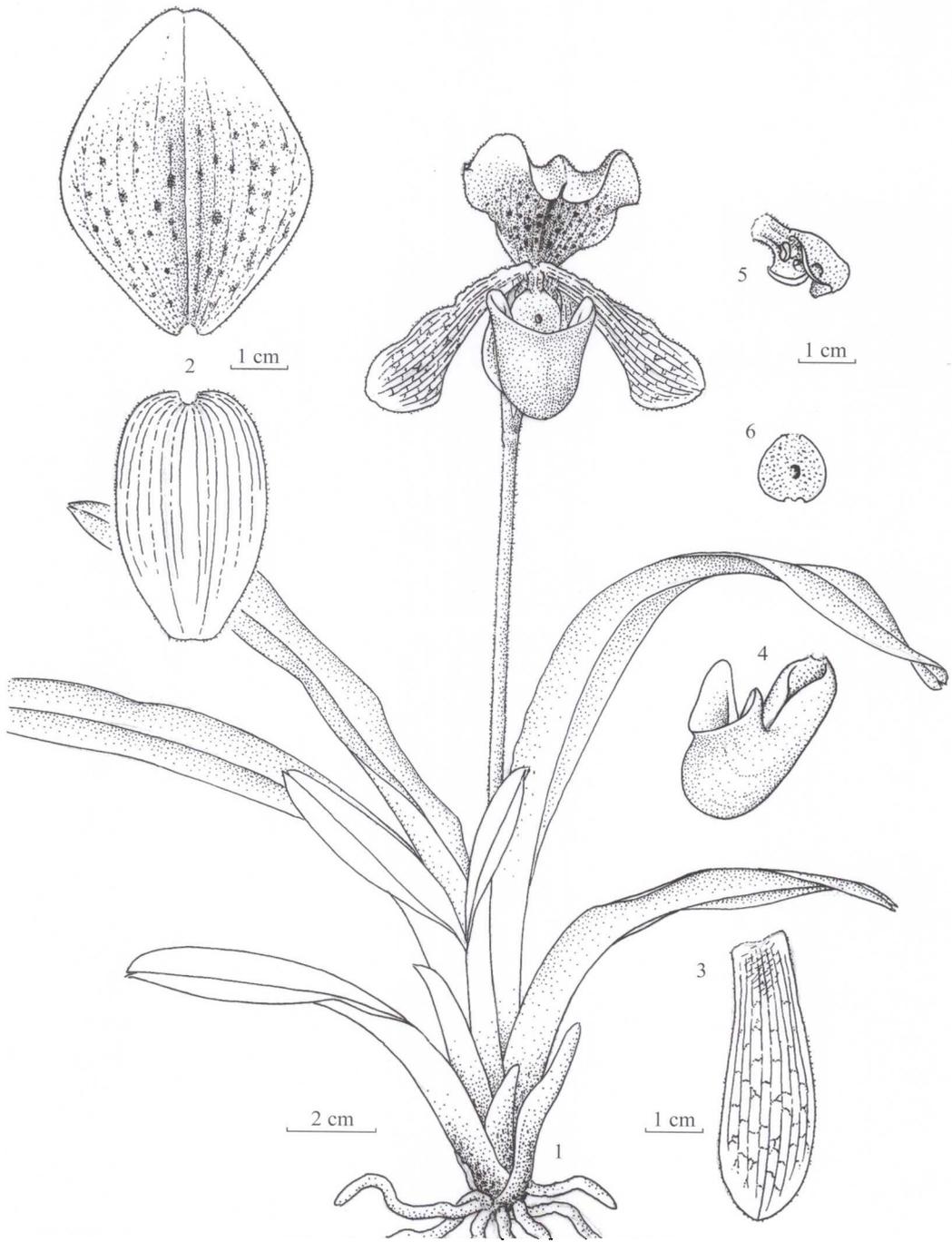


图 5-45. 波瓣兜兰: 1. 带花植株; 2. 中萼片与合萼片; 3. 花瓣; 4. 唇瓣, 侧面观; 5. 蕊柱, 侧面观; 6. 退化雄蕊, 正面观

Fig. 5-45. *Paphiopedilum insigne*: 1. Flowering plant; 2. Dorsal sepal and synsepal; 3. Petal; 4. Lip, side view; 5. Column, side view; 6. Staminode, front view

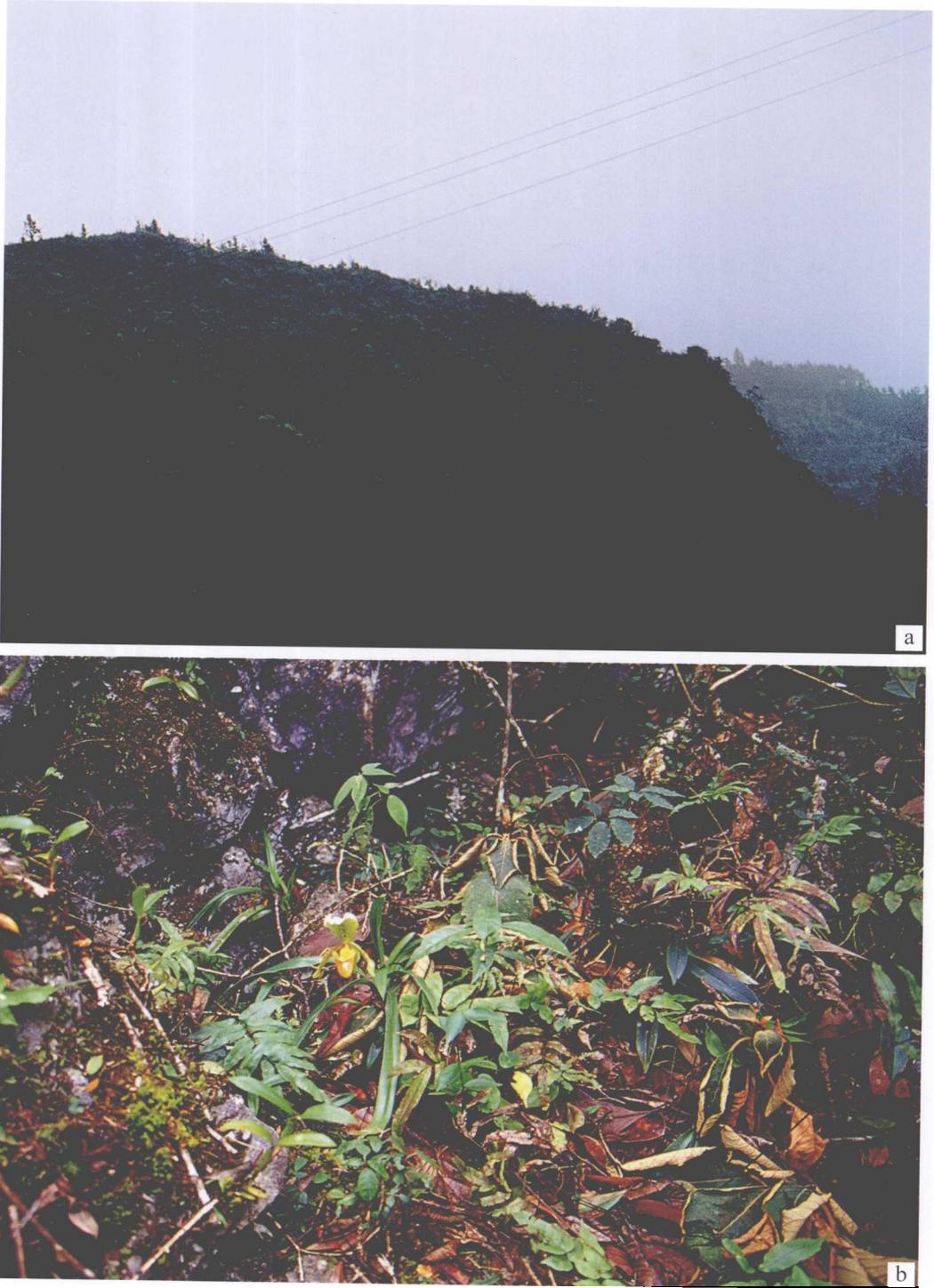


图 5-46. 波瓣兜兰: a. 在云南西南部的自然生境; b. 在云南西南部野外开花
Fig. 5-46. *Paphiopedilum insigne*: a. Its natural habitat in Southwest Yunnan; b. Flowering in the wild in Southwest Yunnan



图 5-47. 波瓣兜兰：a. 在云南西南部野外开花；b-d. 在栽培中开花

Fig. 5-47. *Paphiopedilum insigne*: a. Flowering in the wild in Southwest Yunnan; b-d. Flowering in cultivation

13. 小叶兜兰 (图5-48, 49, 50) (Fig. 5-48, 49, 50)

Paphiopedilum barbigerum T. Tang & F. T. Wang in Bull. Fan Mem. Inst. Biol. Bot. Ser. 10: 23. 1940; P. J. Cribb, Gen. Paphiopedilum: 140. 1987, et Gen. Paphiopedilum (ed. 2): 234. 1998; S. C. Chen & Z. H. Tsi, Orch. China: 118. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 216. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 325. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 64. 1999. **Type:** China, Guizhou, Cavalerie & Fortunat 1794 (holotype, PE!; isotype, P!).

Paphiopedilum insigne (Wall. ex Lindl.) Pfitzer var. *barbigerum* (T. Tang & F. T. Wang) Braem, Paphiopedilum: 113. 1988.

Paphiopedilum barbigerum var. *lockianum* Aver. in Komarovia 2: 11. 2002. **Type:** N Vietnam, Son La, Phan Ke Loc et al. P-10546 (holotype, HN; isotype, LE).

Paphiopedilum coccineum Perner & R. Herrmann in Die Orchidee 51 (5): 623. 2000. **Type:** Vietnam, Cao Ban, G. C. Thieu s. n. (holotype, in Herbarium, Inst. Ecol. Resources, Hanoi).

Paphiopedilum barbigerum var. *coccineum* (Perner & Herrmann) Cavestro, Genre Paphiopedilum: 200. 2001.

Paphiopedilum vejvarutianum Gruss & Roellke in Die Orchidee 54 (1): 56. 2003. **Type:** Thailand, not designated.

地生或石上附生植物。叶4—6枚，宽线形，长8—16 cm，宽1.1—1.5 cm，上面绿色，背面色稍浅，先端钝且常具2小齿。花葶近直立或外弯，长8—16 cm，密被紫褐色毛；苞片绿色，椭圆状卵形，长1.8—3.2 (—3.6) cm，背面近基部有毛；花梗和子房长2.6—5.5 cm，密被紫褐色短柔毛；花单朵，直径6—7 cm；中萼片白色，下半部中央呈黄褐色至绿褐色；合萼片淡绿黄色；花瓣浅褐色，具深色的脉和浅色的边缘；唇瓣浅褐色，具淡黄绿色边缘；退化雄蕊浅黄色，稍有浅褐色晕；中萼片近圆形，长2.8—3.8 cm，宽2.6—3.8 cm，先端钝或微凹，基部边缘常外弯，顶端边缘内弯，背面被微柔毛；合萼片椭圆形，长2.5—3.3 cm，宽1.4—2 cm，背面亦被毛；花瓣狭矩圆形或矩圆状匙形，长3—4 cm，宽1—1.3 cm，先端钝，边缘波状，上面基部被疏柔毛；唇瓣盔状；囊椭圆状卵形，长2—2.5 cm，宽1.5—2 cm，囊口两侧呈耳状；退化雄蕊倒卵状倒心形，长7—10 mm，宽8—10 mm，上面中央或上部具1个黄色脐状突起。

花期：野外为9—10月。

分布：广东西北部(?)、广西北部至西部、贵州西南部、云南东南部；越南北部、泰国。

生境：石灰岩地区疏林中多石之地或岩石缝隙中，或稍荫蔽的悬岩上；海拔800—1500 m。

说明：这是一个广布和变化幅度大的种。例如，它的花通常较小，但有时甚

大；它的白色中萼片下半部中央通常呈黄褐色，但有时为绿褐色。因而很难根据花的大小和色泽进行更细的划分。

在中国云南麻栗坡靠近越南边界曾报告有一白化型，即黄花变型[f. *aureum* (S. Hua Hu) Gruss & Roeth (1999)]。

越南曾发现此种与亨利兜兰 (*P. henryanum*) 之间的天然杂种：散生兜兰 (杂种) *Paphiopedilum* × *aspersum* Aver. (in Komarovia 2: 17. 2002)，但未见于中国。

Terrestrial or lithophytic plants. Leaves 4–6, broadly linear, 8–16 cm long, 1.1–1.5 cm wide, uniformly green adaxially, slightly paler abaxially, acute and usually minutely tridenticulate at apex. Scape suberect or arching, 8–16 cm long, densely covered with purple-brown hairs; bract elliptic-ovate, 1.8–3.2 (–3.6) cm long, hairy toward abaxial base; pedicel and ovary 2.6–5.5 cm long, densely purple-brown-pubescent; flower single, 6–7 cm across; dorsal sepal white, basal half suffused with yellow-brown to green-brown centrally; synsepal usually pale yellow-green; petals pale brown with deeper veins and paler margins; lip pale brown with pale yellow-green margins; staminode pale yellow slightly flushed with pale brown; dorsal sepal suborbicular, 2.8–3.8 cm long, 2.6–3.8 cm wide, obtuse or retuse at apex, basal margins usually recurved, apical margins incurved, puberulous abaxially; synsepal elliptic, 2.5–3.3 cm long, 1.4–2 cm wide, puberulous abaxially; petals narrowly oblong or oblong-spatulate, 3–4 cm long, 1–1.3 cm wide, obtuse at apex, undulate-margined, pilose toward adaxial base; lip helmet-shaped; pouch ellipsoid-ovoid, 2–2.5 cm long, 1.5–2 cm wide, auriculate on both sides of its mouth; staminode obovate-obcordate, 7–10 mm long, 8–10 mm wide, yellow-umbonate in central or upper part.

Flowering period: September and October in the wild.

Distribution: NW Guangdong(?), N to W Guangxi, SW Guizhou, SE Yunnan; N Vietnam, Thailand.

Habitat: In rocky places or crevices of rocks in open forests or on slightly shaded cliffs in limestone areas at an elevation of 800–1500 m.

Note: This is a widespread and highly variable species. For example, its flowers are usually rather small, but sometimes much larger. Its white dorsal sepal is usually suffused with yellow-brown, but sometimes becoming green-brown in basal half. Therefore, it is difficult to separate them based on floral size and color.

An albino form was reported from southeastern Yunnan near the border with Vietnam: f. *aureum* (S. Hua Hu) Gruss & Roeth (1999).

A natural hybrid, *Paphiopedilum* × *aspersum* Aver. (in Komarovia 2: 17. 2002), between this species and *P. henryanum* was reported from Vietnam, which has not been found in China.

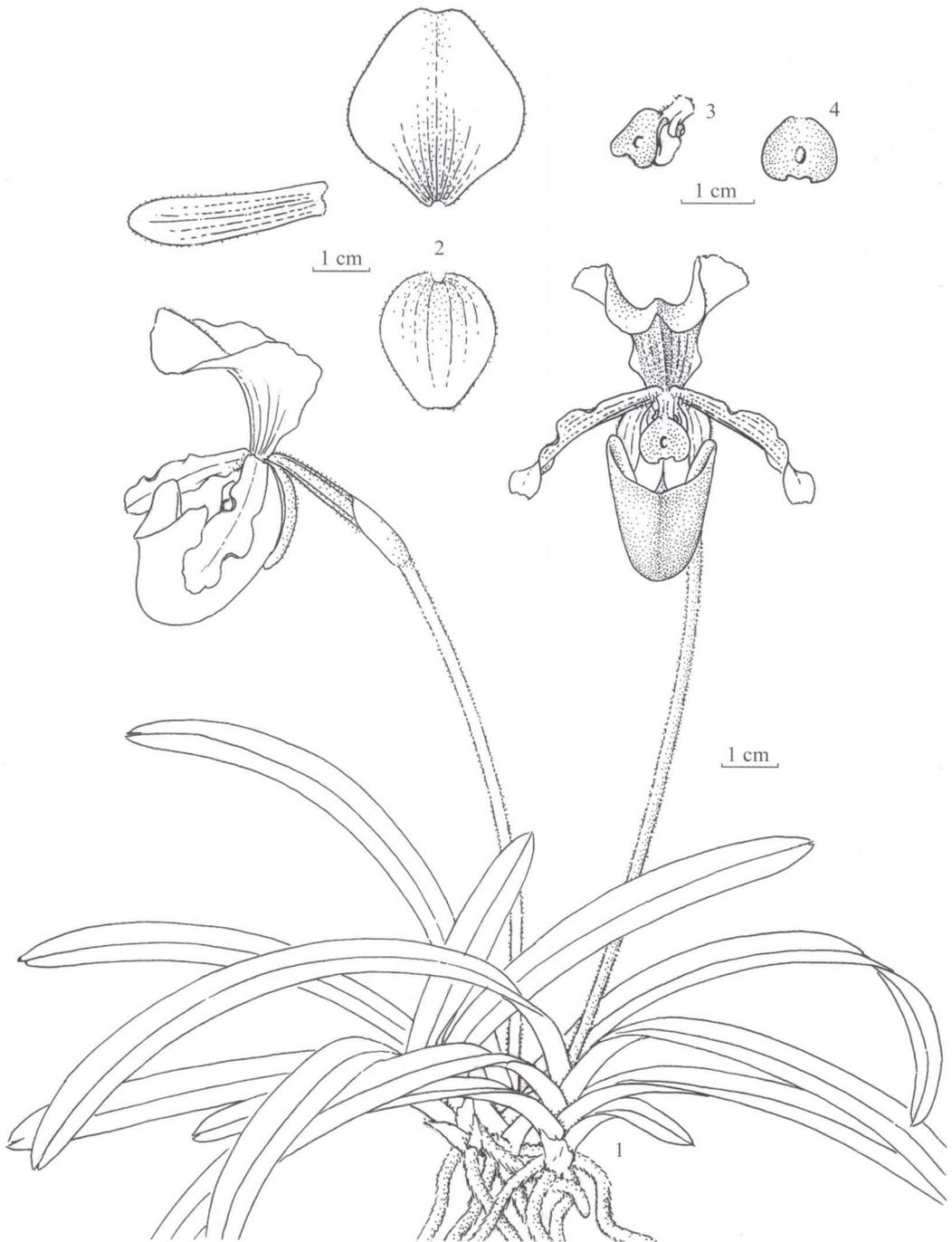


图 5-48. 小叶兜兰: 1. 带花植株; 2. 中萼片、花瓣与合萼片; 3. 蕊柱; 4. 退化雄蕊
Fig. 5-48. *Paphiopedilum barbigerum*: 1. Flowering plants; 2. Dorsal sepal, petal and synsepal; 3. Column; 4. Staminode

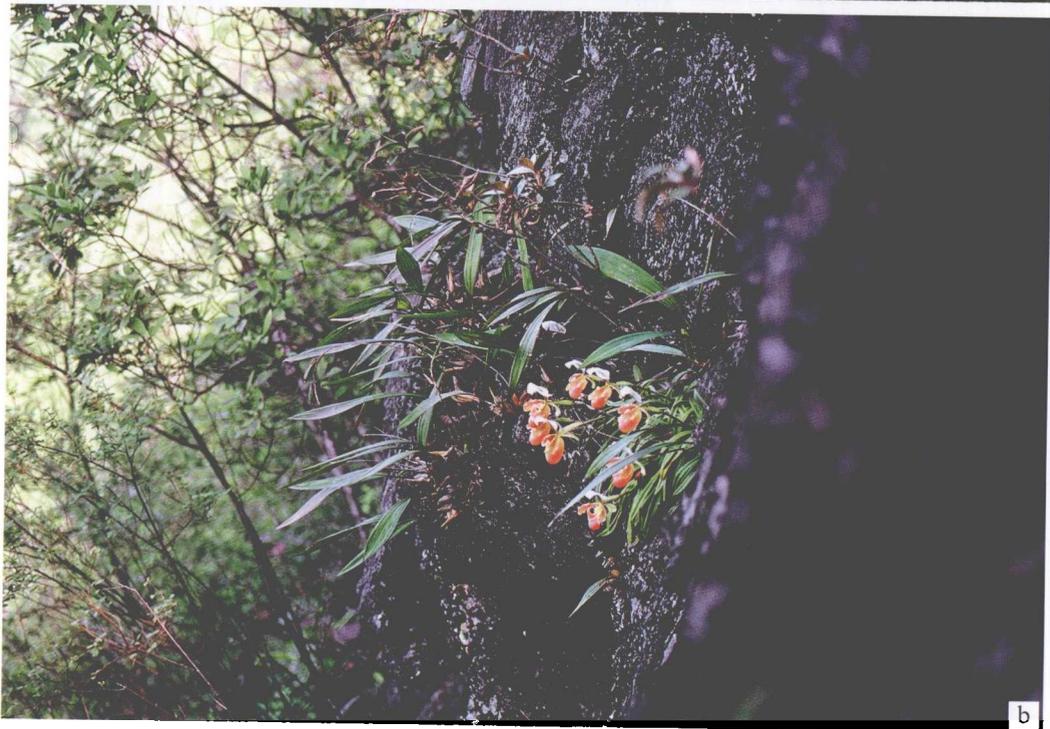


图 5-49. 小叶兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-49. *Paphiopedilum barbigerum*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan

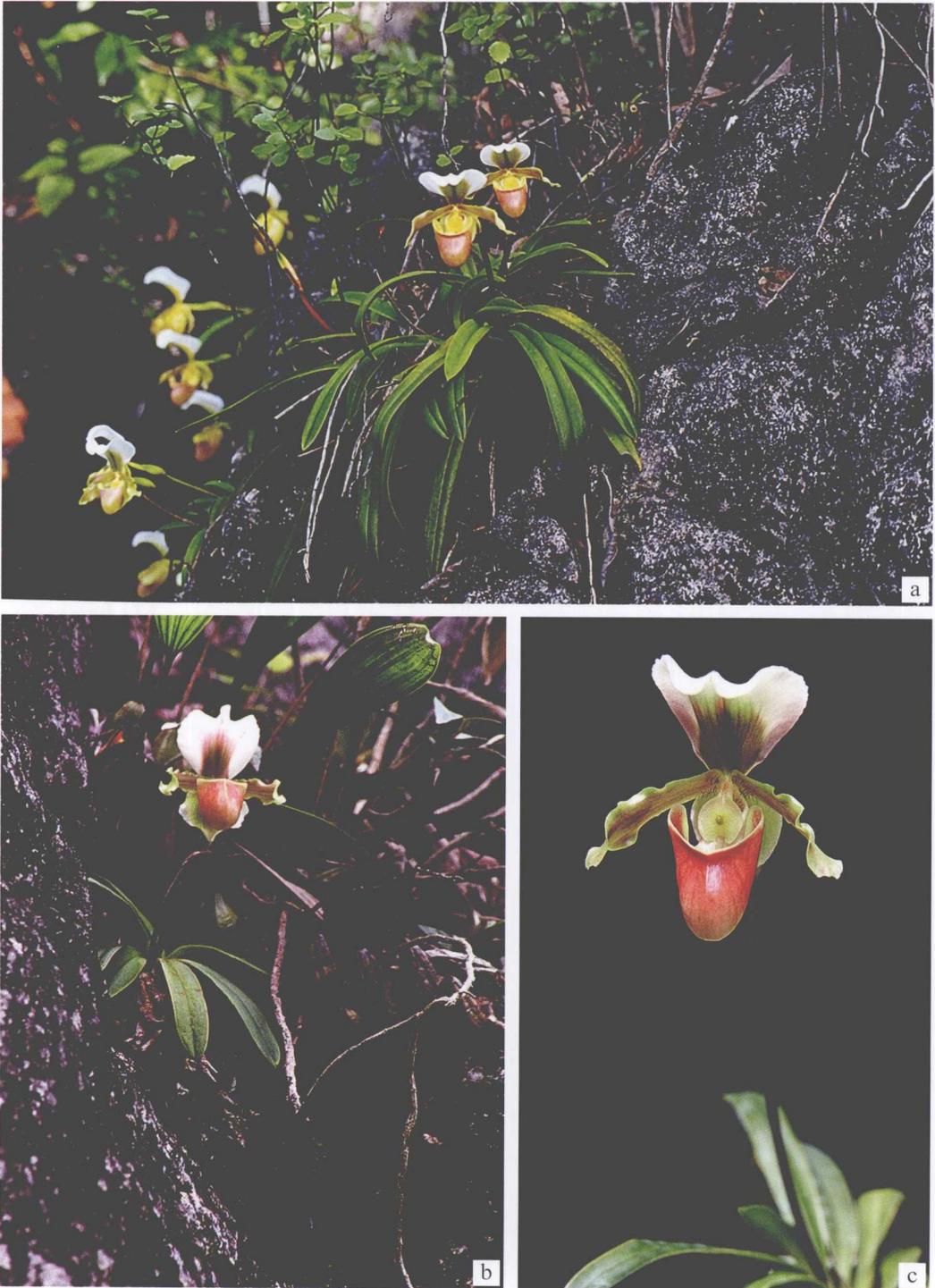


图 5-50. 小叶兜兰: a, b. 在贵州西南部野外开花; c. 在栽培中开花

Fig. 5-50. *Paphiopedilum barbigerum*: a, b. Flowering in the wild in Southwest Guizhou; c. Flowering in cultivation

14. 根茎兜兰 (图5-51, 52; 图版10, 11) (Fig. 5-51, 52; Pl. 10, 11)

Paphiopedilum areeanum Gruss in Die Orchidee 52 (5): 645. 2001. **Type:** China, Yunnan, Luxi county, R. S. Huang 9064 (holotype, Guangxi Bot. Gard. of Medicinal plants!).

Paphiopedilum rhizomatosum S. C. Chen & Z. J. Liu in J. Wuhan Bot. Res. 20 (1): 12. 2002. **Type:** N Myanmar, cult., Z. J. Liu 21024 (holotype, NOCC!).

地生植物, 具直生的根状茎; 根状茎茎状, 长8—10 cm, 直径8—12 mm, 彼此相连接, 节间长5—20 mm, 末端通常有数簇叶。叶狭矩圆形, 长15—35 cm, 宽2.5—3.5 cm, 先端常稍2裂, 上面暗绿色, 背面浅绿色并在基部具紫斑。花葶近直立, 长25—30 cm, 浅绿褐色, 被短柔毛; 苞片卵形, 长3.7—4.2 cm, 宽2.2—2.4 cm, 绿色, 近无毛; 花梗和子房长5.5—6 cm, 密被紫褐色毛; 花单朵, 直径8—9 cm; 中萼片浅褐绿色, 具宽阔白色边缘, 下半部有褐色条纹; 合萼片浅黄绿色, 有模糊的深色脉; 花瓣浅黄绿色, 具紫褐色脉; 唇瓣浅绿褐色, 具暗色脉; 退化雄蕊浅黄色; 中萼片宽椭圆形, 长4.5—5.5 cm, 宽3.5—3.7 cm, 先端微缺, 基部边缘外弯, 背面密被微柔毛, 上面近基部有紫色长柔毛; 合萼片卵状矩圆形, 长4.5—4.8 cm, 宽2.2—2.4 cm, 背面被紫色微柔毛; 花瓣狭矩圆状匙形, 长4.5—5.5 cm, 宽1.4—1.6 cm, 先端近急尖, 边缘有缘毛且稍呈波状; 唇瓣盔状; 囊椭圆状卵形, 长2.4—2.8 cm, 宽1.8—2.1 cm, 囊口两侧呈耳状; 退化雄蕊倒卵形, 长1.3—1.4 cm, 宽1.1—1.2 cm, 中央有1个脐状突起。

花期: 野外为8月; 园中栽培为10—11月。

分布: 云南西南部至西部 (潞西县和高黎贡山); 缅甸北部。

生境: 生于林下枯木上。

说明: 这无疑是一个独立的种。没有充分的证据表明它是小叶兜兰 (*P. barbigerum*) 与紫毛兜兰 (*P. villosum*) 之间的天然杂种, 如O. Gruss所认定的那样。

Terrestrial plants, with a straight rhizome; rhizome stem-like, 8–10 cm long, 8–12 mm in diam. linking up with each other, with internodes 5–20 mm long, at its summit usually with several tufts of leaves. Leaves narrowly oblong, 15–35 cm long, 2.5–3.5 cm wide, usually slightly bilobulate at apex, adaxially dark green, abaxially pale green and marked with purple toward the base. Scape suberect, 25–30 cm long, pale green-brown, pubescent; bract ovate, 3.7–4.2 cm long, 2.2–2.4 cm wide, pale green, subglabrous; pedicel and ovary 5.5–6 cm long, densely purple-brown-hairy; flower single, 8–9 cm across; dorsal sepal pale brown-green with broad white margins, brown-striped in basal half; synsepal pale yellow-green, obscurely with deeper veins; petals pale yellow-green with purple-brown veins; lip pale green-brown with darker veins; staminode pale yellow; dorsal sepal broadly elliptic, 4.5–5.5 cm long, 3.5–3.7 cm wide, emarginate at apex, basal margins revurved, densely puberulous abaxially, purplish villose toward adaxial base; synsepal ovate-oblong, 4.5–4.8 cm long, 2.2–2.4 cm wide, purplish-puberulous abaxially; petals narrowly oblong-spatulate, 4.5–5.5 cm long, 1.4–1.6 cm wide, subacute at apex, ciliate, slightly undulate-margined; lip

helmet-shaped; pouch ellipsoid-ovoid, 2.4–2.8 cm long, 1.8–2.1 cm wide, auriculate on both sides of its mouth; staminode subovate, 1.3–1.4 cm long, 1.1–1.2 cm wide, with a raised umbo centrally.

Flowering period: August in the wild; October and November in cultivation.

Distribution: SW to W Yunnan (Luxi county and Gaoligong Mt.); N Myanmar.

Habitat: On withered trees in forests.

Note: This is no doubt a distinct species. There is not enough evidence to prove it a natural hybrid between *P. barbigerum* and *P. villosum* as suggested by O. Gruss.

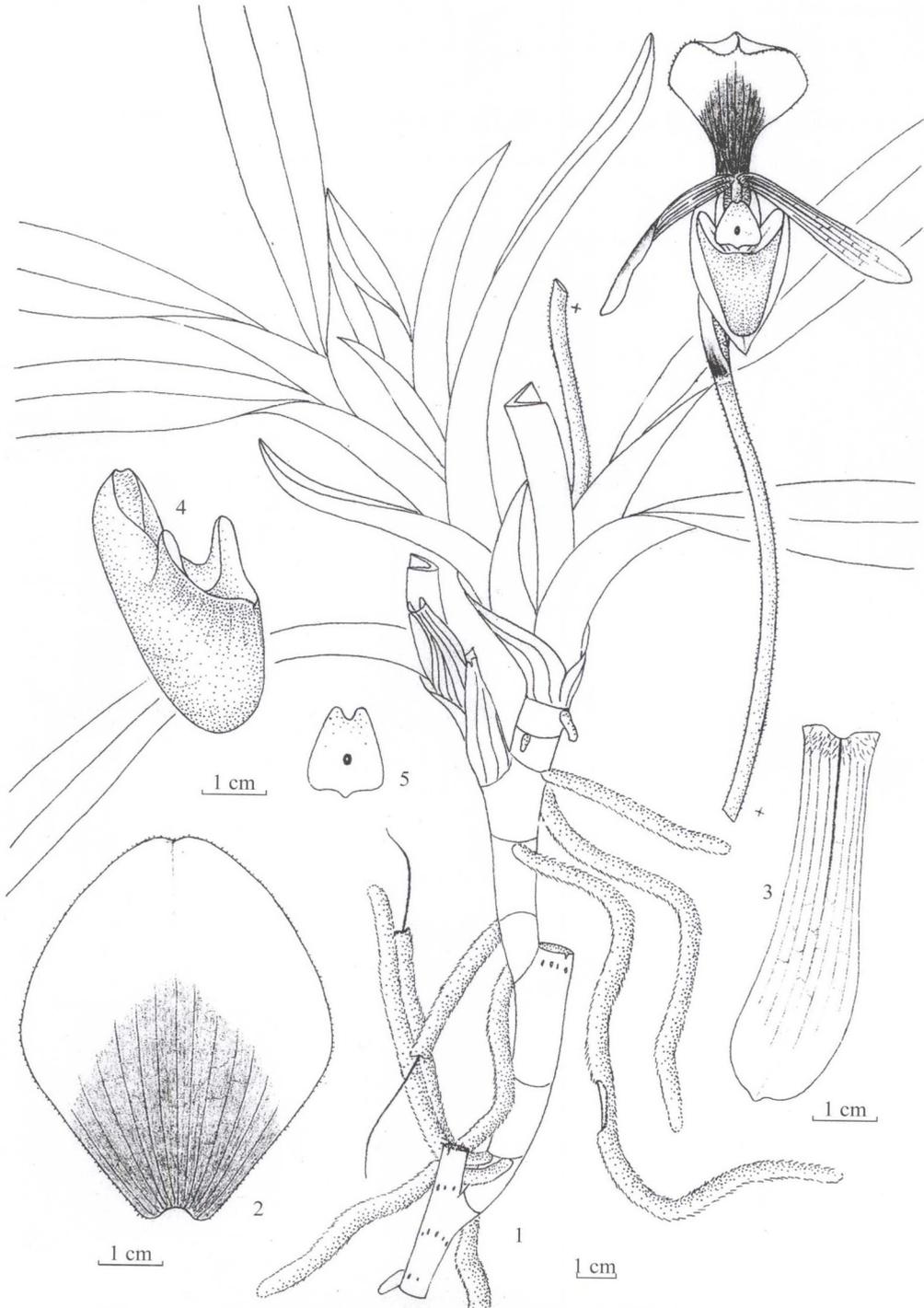


图 5-51. 根茎兜兰: 1. 带花植株; 2. 中萼片; 3. 花瓣; 4. 唇瓣, 侧面观; 5. 退化雄蕊, 正面观
 Fig. 5-51. *Paphiopedilum areeanum*: 1. Flowering plant; 2. Dorsal sepal; 3. Petal; 4. Lip, side view; 5. Staminode, front view

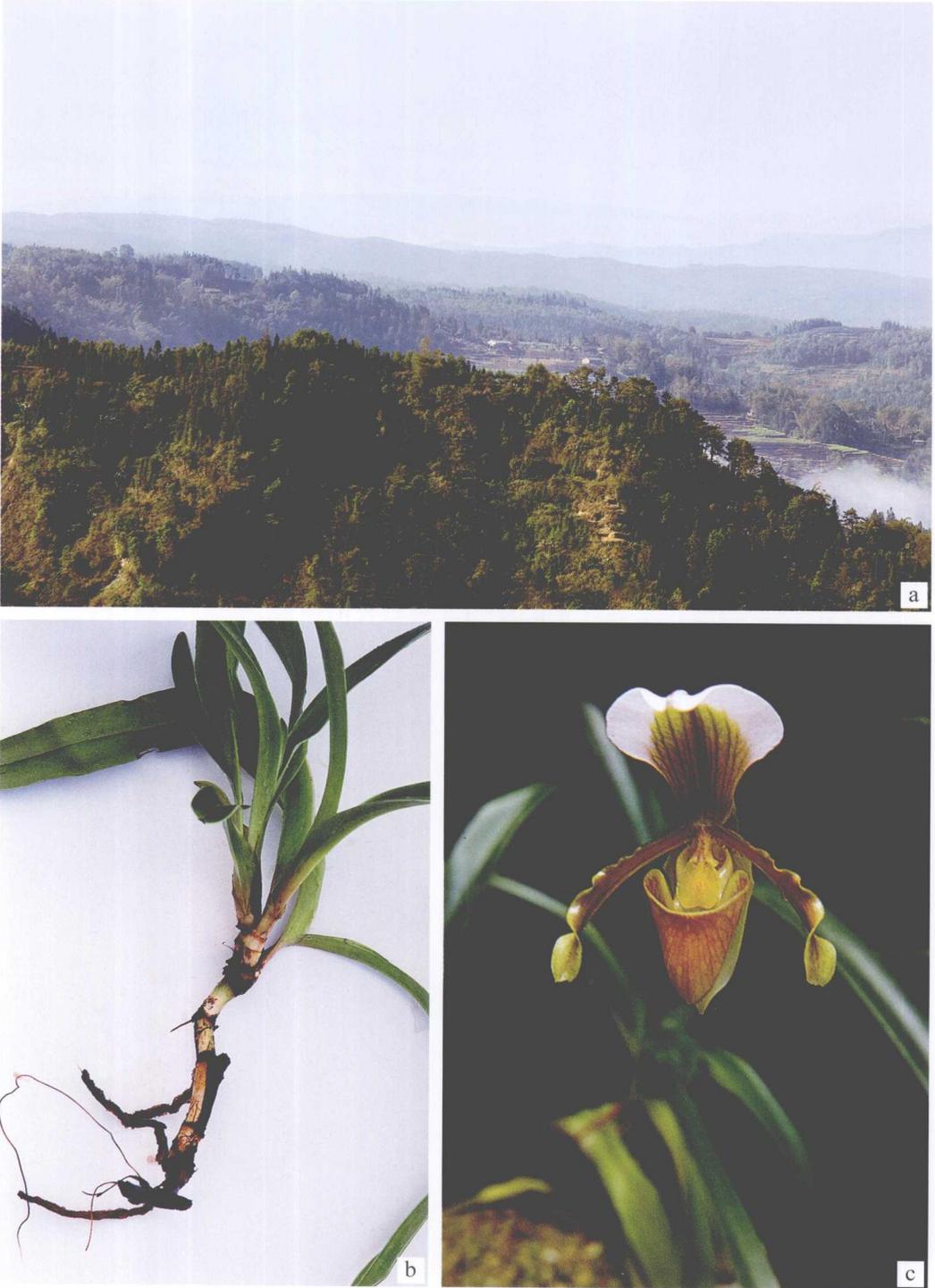
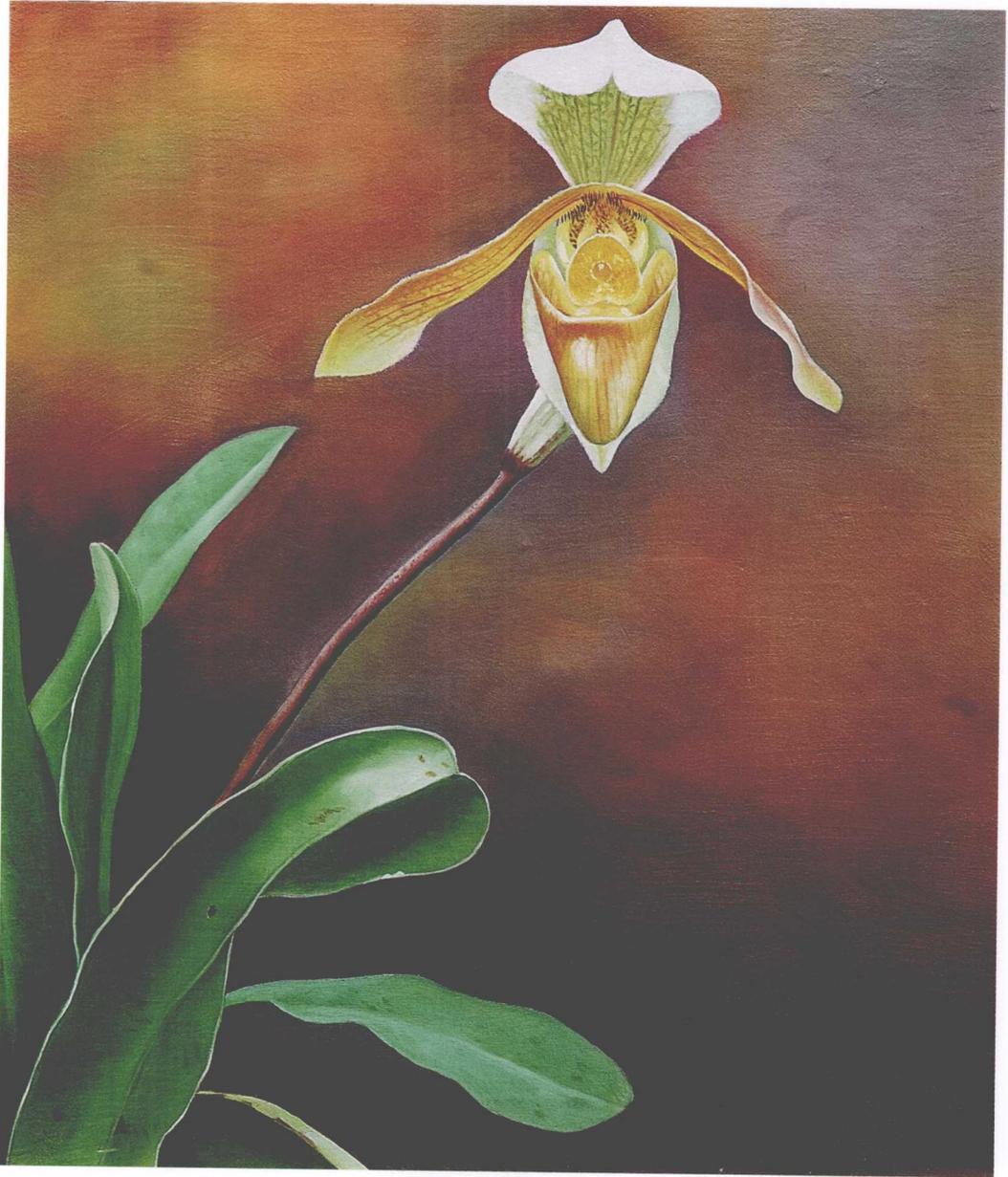


图 5-52. 根茎兜兰: a. 在云南西部的自然生境; b. 植株具茎状根状茎; c. 在栽培中开花
Fig. 5-52. *Paphiopedilum areeanum*: a. Its natural habitat in western Yunnan; b. Plant with stem-like rhizome; c. Flowering in cultivation



图版 10. 根茎兜兰
Plate 10. *Paphiopedilum areeanum*

油画 作者: 李丝云
Oil painting by Si -yun Li



图版 11. 根茎兜兰
Plate 11. *Paphiopedilum areeanum*

水彩画 作者: 吴俊强
Water color painting by Jun-qiang Wu

15. 天伦兜兰 (图5-53, 54, 55) (Fig. 5-53, 54, 55)

Paphiopedilum tranlienianum Gruss & Perner in *Caesiana* 11: 66. 1998; Braem, C. Baker & M. Baker, *Gen. Paphiopedilum Nat. Hist. Cult.* 2: 222. 1999; Aver. et al., *Slipper Orch. Vietnam*: 175. 2003. **Type:** Vietnam, Bac Thai, cult. O. Gruss (holotype, RO).

Paphiopedilum tranlienianum var. *saxosum* X. M. Xu in *J. South China Agric. Univ.* 26 (1): 113. 2005. **Type:** China, SE Yunnan, Z. J. Liu 2536 (holotype, NOCC!).

地生或石上附生植物。叶4—6枚，狭矩圆形，长10—24 cm，宽1.6—2.7 cm，先端2浅裂或略有3小齿，上面深绿色并具浅色边缘，背面淡绿色。花葶近直立或外弯，长10—15 cm，绿色，密被紫红色短毛；苞片卵形，长1.8—3 cm，宽1.2—1.4 cm，先端边缘具白色缘毛；花梗和子房长3—4 cm，密被紫色短柔毛；花单朵，直径6—6.5 cm；中萼片白色，下部2/3具紫褐色纵条纹；合萼片浅绿色，略有紫褐色脉；花瓣与唇瓣浅绿色，有紫褐色脉与晕；退化雄蕊浅黄绿色，具绿色脐状突起；中萼片近圆形，长、宽各为2.5—3.5 cm，先端急尖，基部边缘外弯，边缘具细缘毛；合萼片倒卵形，长2.2—3 cm，宽1.7—2 cm，先端近急尖；花瓣狭矩圆形，长2.7—3.9 cm，宽8—10 mm，先端钝，近基部有紫色毛，边缘强烈波状并有白色缘毛；唇瓣盔状；囊椭圆形，长2.2—2.4 cm，宽1.5—1.8 cm，囊口两侧稍呈耳状；退化雄蕊宽倒卵形，长、宽各约1 cm，在下部有1个脐状突起。2*n*=26。

花期：野外为9月。

分布：云南东南部（麻栗坡县）；越南北部。

生境：灌丛中多石和排水良好之地；海拔约1000 m。

说明：该种之下有一个白化型，即白绿变型（f. *alboviride* Gruss），越南产，发表于2005年。

Terrestrial or lithophytic plants. Leaves 4–6, narrowly oblong, 10–24 cm long, 1.6–2.7 cm wide, unequally bilobulate or slightly tridentate at apex, adaxially deep green with paler margins, abaxially light green. Scape suberect or arching, 10–15 cm long, green, densely covered with short purple-red hairs; bract ovate, 1.8–3 cm long, 1.2–1.4 cm wide, white-ciliate on apical margins, green, spotted with purple-red; pedicel and ovary 3–4 cm long, densely purple-pubescent; flower single, 6–6.5 cm across; dorsal sepal white with purple-brown longitudinal stripes in basal two thirds; synsepal pale green, more or less with purple-brown veins; petals and lip pale green clearly flushed and veined with purple-brown; staminode pale yellow-green with a green umbo; dorsal sepal suborbicular, 2.5–3.5 cm long and wide, acute at apex, basal margins recurved, minutely ciliate; synsepal subovate, 2.2–3 cm long, 1.7–2 cm wide, subacute at apex; petals narrowly oblong, 2.7–3.9 cm long, 8–10 mm wide, obtuse at apex, purple-hairy toward the base, white-ciliate, strongly undulate-margined; lip helmet-shaped; pouch ellipsoid, 2.2–2.4 cm long, 1.5–1.8 cm wide, slightly auriculate on both sides of its mouth; staminode broadly obovate, ca. 1 cm long and wide, with an umbo in lower part. 2*n*=26.

Flowering period: September in the wild.

Distribution: SE Yunnan (Malipo county); N Vietnam.

Habitat: In rocky and well-drained places in thickets at an altitude of nearly 1000 m.

Note: An albino form of this species, f. *alboviride* Gruss, was described from Vietnam in 2005.

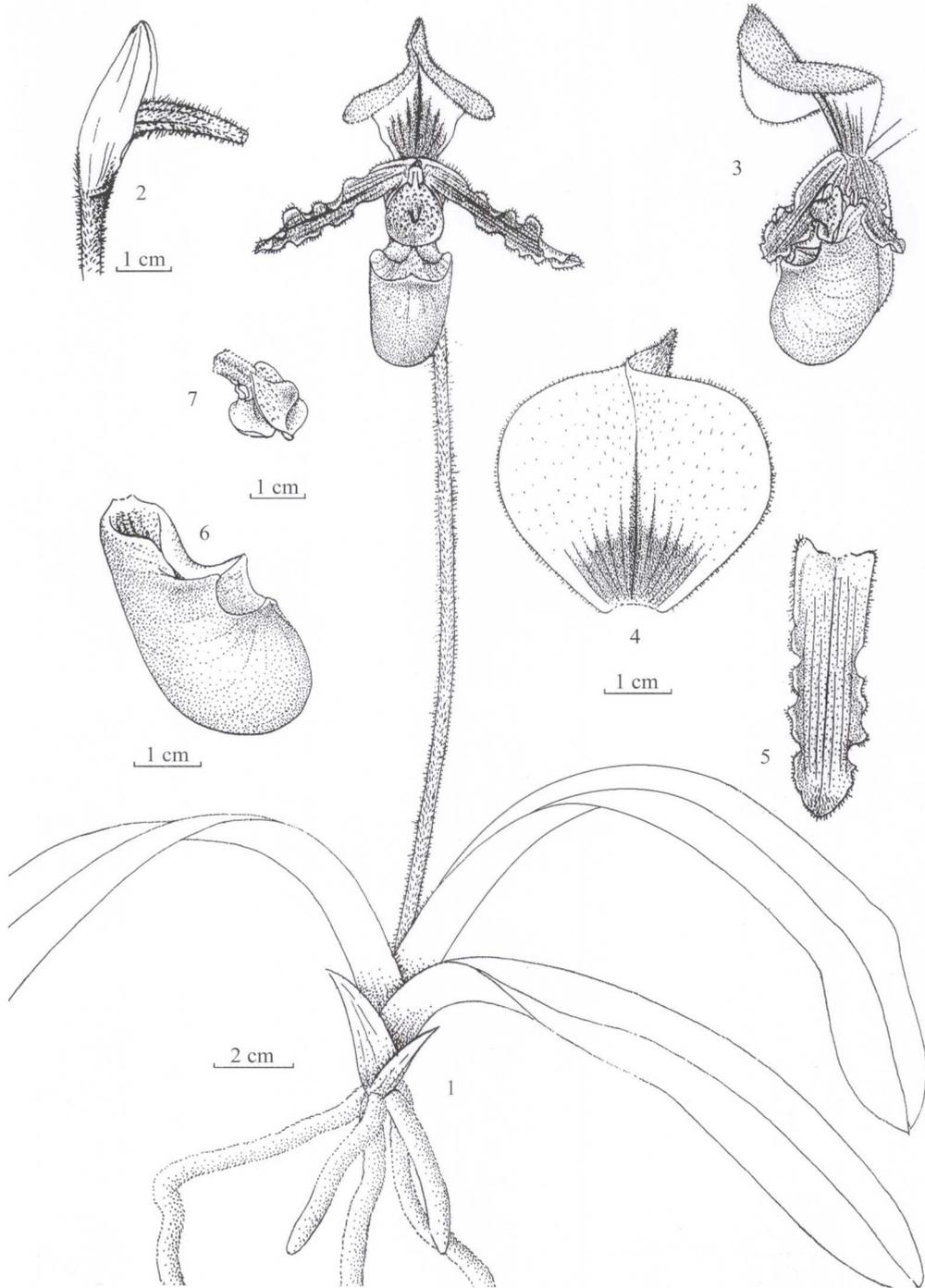


图 5-53. 天伦兜兰: 1. 带花植株; 2. 苞片及子房; 3. 花, 侧面观; 4. 中萼片; 5. 花瓣; 6. 唇瓣, 侧面观; 7. 蕊柱, 侧面观

Fig. 5-53. *Paphiopedilum tranlienianum*: 1. Flowering plant; 2. Bract and ovary; 3. Flower, side view; 4. Dorsal sepal; 5. Petal; 6. Lip, side view; 7. Column, side view



图 5-54. 天伦兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-54. *Paphiopedilum tranlienianum*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan



图 5-55. 天伦兜兰：a, b. 在栽培中开花

Fig. 5-55. *Paphiopedilum tranlienianum*: a, b. Flowering in cultivation

16. 巧花兜兰 (图5-56, 57, 58; 图版12) (Fig. 5-56, 57, 58; Pl. 12)

Paphiopedilum helenae Aver. in Bot. J (Leningrad) 81(9): 109. 1996; P. J. Cribb, Gen. Paphiopedilum (ed. 2): 238. 1998; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 220. 1999; Aver. et al., Slipper Orch. Vietnam: 182. 2003. **Type:** N. Vietnam, Cao Bang Prov., Tra Linh Distr., near Thang Heng Lake, L. Aver., N. T. Hiep & D. D. Huyen CB 012 (holotype, LE; isotype, HN).

Paphiopedilum delicatum Z. J. Liu & J. Yong Zhang in Acta Phytotax, Sin. 39 (1): 78. 2001. **Type:** Vietnam, cult., Z. J. Liu 20920 (holotype, NOCC!).

石上附生植物。叶2—4枚，狭矩圆形或线状倒披针形，长8—12.5 cm，宽0.8—1.6 cm，厚革质或肉革质，先端急尖或不等的2裂，上面暗绿色，背面浅绿色并在近基部处具紫色细斑点，边缘黄白色。花葶外弯或平展，长约10 cm，绿色，有紫色斑点和黑紫色毛；苞片宽卵形，长10—13 mm，宽7—10 mm，绿色，有紫色斑点，背面近基部被微柔毛；花梗和子房长2.9—3.1 cm，被黑紫色毛；花单朵，直径3—4（—5）cm；中萼片浅黄色或略呈金黄色，边缘白色；合萼片浅黄色至乳白色；花瓣浅黄绿色或浅褐黄色，中脉的上侧常有枣红色晕；唇瓣浅黄绿色，有枣红色晕；退化雄蕊浅黄绿色，中央具绿色脐状突起；中萼片近圆形至宽椭圆形，长2.5—3.5 cm，宽1.5—2.8 cm，先端钝或微缺，边缘稍波状，有细缘毛；合萼片近圆形或宽椭圆形，长2.2—2.4 cm，宽1—1.7 cm，先端钝或具2小齿；花瓣线状匙形或狭矩圆形，长2.5—3.2 cm，宽4—8 mm，先端钝，先端边缘具细缘毛；唇瓣盔状；囊近椭圆形，长1.4—2 cm，宽1.5—1.8 cm，通常在前方表面膨胀凸出，囊口两侧呈耳状；退化雄蕊宽倒卵形至倒卵状圆形，长与宽各6—7 mm，上面具小乳突并在中央具脐状突起。

花期：野外为9—11月。

分布：广西西南部（那坡县）；越南北部。

生境：灌木丛生的岩壁缝隙中；海拔700—1100 m。

说明：该种之下有一个白化型，即黄花变型（f. *aureum* Gruss & Roeth），发表于1999年。

Lithophytic plants. Leaves 2–4, narrow-oblong to linear-oblong, 8–12.5 cm long, 0.8–1.6 cm wide, thick-coriaceous or fleshy-coriaceous, acute or unequally bilobed at apex, adaxially dark green, abaxially light green and with small purple spots toward the base, margins yellow-whitish. Scape arching or horizontally spreading, ca. 10 cm long, green, purple-spotted, with black-purple hairs; bract broadly ovate, 10–13 mm long, 7–10 mm wide, green, purple-spotted, pubescent toward abaxial base; pedicel and ovary 2.9–3.1 cm long, with black-purple hairs; flower single, 3–4 (–5) cm across; dorsal sepal pale yellow or somewhat golden yellow, whitish-margined; synsepal pale yellow to whitish; petals pale yellow-green or pale brown-yellow, upper side of midvein usually flushed with pale purple-red; lip pale yellow-green tinged with purple-red; staminode pale yellow-green with a central green umbo; dorsal sepal suborbicular to broadly elliptic, 2.5–3.5 cm

long, 1.5–2.8 cm wide, obtuse-emarginate at apex, slight undulate-margined, minutely ciliate; synsepal suborbicular or broadly elliptic, 2.2–2.4 cm long, 1–1.7 cm wide, obtuse or minutely bidentate at apex; petals linear-spatulate or narrow-oblong, 2.5–3.2 cm long, 4–8 mm wide, obtuse at apex, minutely ciliate on apical margins; lip helmet-shaped; pouch subellipsoid, 1.4–2 cm long, 1.5–1.8 cm wide, usually convex-inflated on front surface, auriculate on both sides of its mouth; staminode broadly obovate to obovate-orbicular, 6–7 mm long and wide, adaxially minutely papillose and with a central umbo.

Flowering period: September to November in the wild.

Distribution: SW Guangxi (Napo county); N Vietnam.

Habitat: In crevices of shrubby cliffs at an elevation of 700–1100 m.

Note: An albino form of this species, f. *aureum* Gruss & Roeth, was described in 1999.

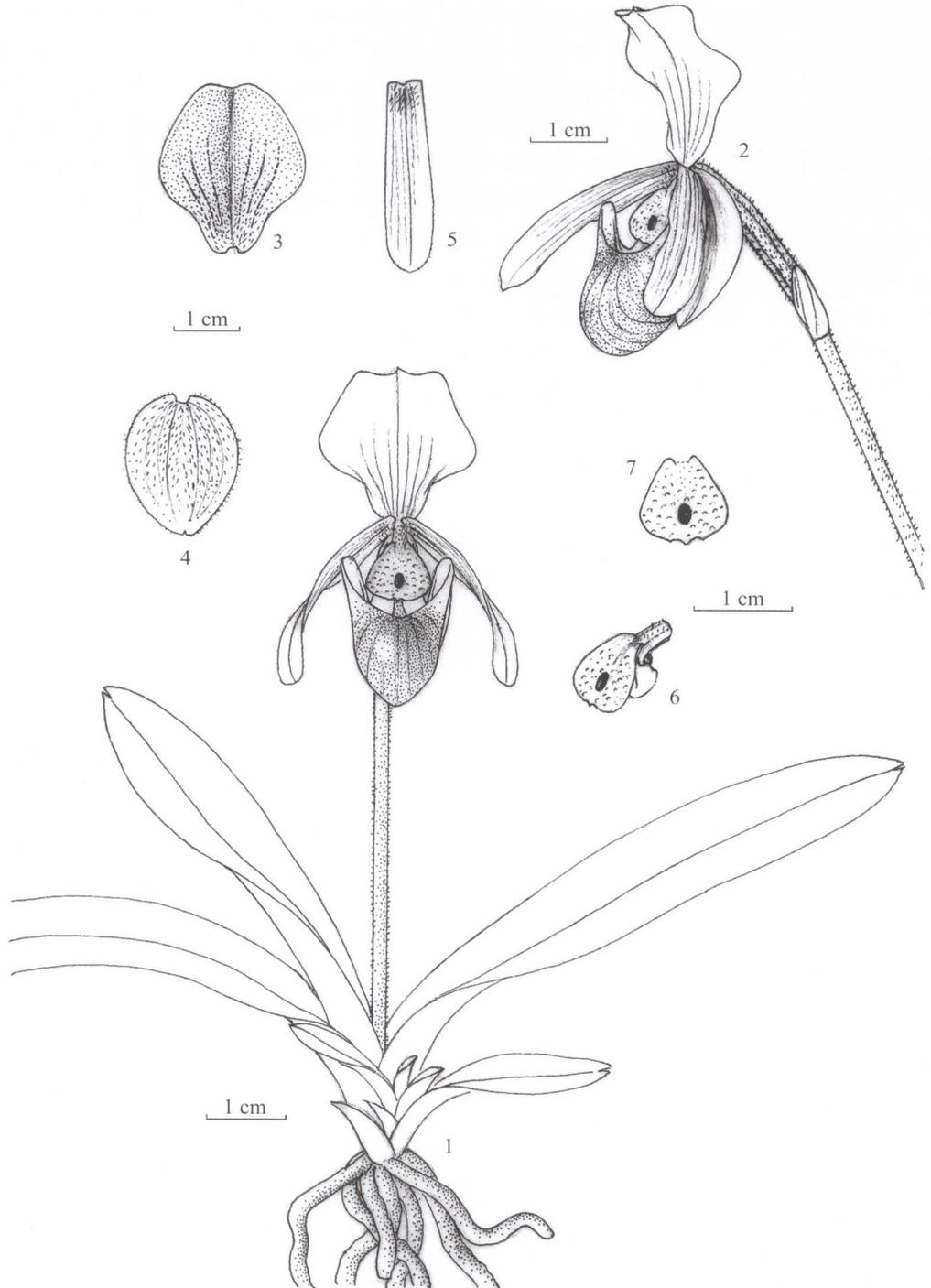


图 5-56. 巧花兜兰: 1. 带花植株; 2. 花, 侧面观; 3. 中萼片, 背面观; 4. 合萼片, 背面观; 5. 花瓣, 正面观; 6. 蕊柱; 7. 退化雄蕊

Fig. 5-56. *Paphiopedilum helenae*: 1. Flowering plant; 2. Flower, side view; 3. Dorsal sepal, back view; 4. Synsepal, back view; 5. Petal, front view; 6. Column; 7. Staminode

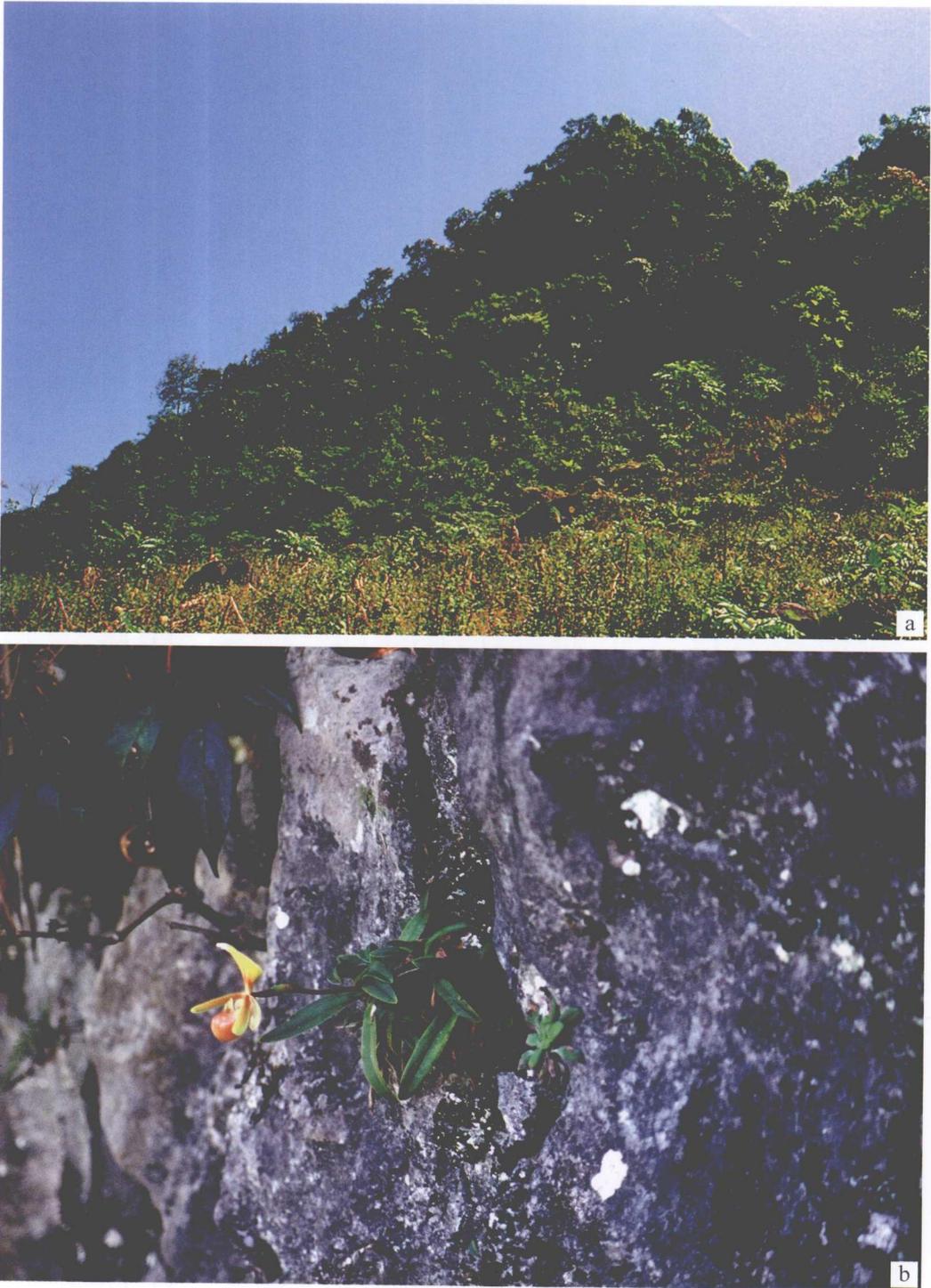


图 5-57. 巧花兜兰: a. 在广西西南部的自然生境; b. 在广西西南部野外开花
Fig. 5-57. *Paphiopedilum helenae*: a. Its natural habitat in Southwest Guangxi; b. Flowering in the wild in Southwest Guangxi



图 5-58. 巧花兜兰: a. 在广西西南部野外开花; b, c. 在栽培中开花
Fig. 5-58. *Paphiopedilum helenae*: a. Flowering in the wild in Southwest Guangxi; b, c. Flowering in cultivation



图版 12. 巧花兜兰
Plate 12. *Paphiopedilum helenae* Aver

水彩画 作者: 吴俊强
Water color painting by Jun -qiang Wu

17. 亨利兜兰 (图5-59, 60, 61; 图版13) (Fig. 5-59, 60, 61; Pl. 13)

Paphiopedilum henryanum Braem in Schlechteriana 1 (1): 4. 1987 (3 sept), & in Orchid Digest 52 (1): 11. 1988; P. J. Cribb, Gen. Paphiopedilum (ed. 2): 246. 1998; S. C. Chen & Z. H. Tsi, Orch. China: 122. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 204. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China colour: 331. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 65. 1999; Aver. et al., Slipper Orch. Vietnam: 191. 2003. **Type:** China, bordering Vietnam, Azadehdel s. n. (holotype, SCHLE).

Paphiopedilum dollii Lueckel in Die Orchidee 38 (5): 266. 1987 (18 sept). **Type:** China, cult. H. Doll (holotype, K!).

Paphiopedilum chaoi S. Hua Hu in Die Orchidee 50 (5): 495. 1999. **Type:** China, Guangxi, Napo county, M. H. Chao 5322 (holotype, IBSC).

Paphiopedilum trantuanhii G. Gogniat & X. G. de Loubresse in Selected Orchid Science 1 (1): 2. 2007. **Type:** Vietnam, Son La Province, Tran Tuan Anh 06P0901 (holotype, Herbarium Ngoclan Hanoi).

地生或石上附生植物。叶3—6枚，革质，狭矩圆形，长12—23 cm，宽1.1—1.8 (—2.4) cm，先端不等的2浅裂或具3个细齿，上面深绿色或有时有狭窄的黄白色边缘，背面浅绿色或有时最基部有紫褐色斑。花葶外弯或近直立，长14—17 cm，绿色或浅褐绿色，具褐紫色短柔毛；苞片宽卵形，长2—3.2 cm，宽0.6—1.8 cm，绿色，有紫褐色斑点；花梗和子房长3.5—4 cm，具紫褐色短柔毛；花单朵，直径6—7 cm；中萼片浅黄绿色至暗黄色，具紫褐色大斑点；合萼片与中萼片色泽相似，但斑点要少得多；花瓣粉红紫色或浅紫红色，在下半部或全部具暗紫色或黑紫色大斑点；唇瓣粉红紫色或浅紫红色，具浅黄色的边缘；退化雄蕊浅黄色，稍有浅紫色或褐色的晕，具绿色或褐黄色脐状突起；中萼片通常直立，宽卵形至近卵圆形，长3—3.5 cm，宽3.2—3.8 cm，先端钝，边缘波状，具细缘毛，基部边缘外弯，背面被微柔毛；合萼片椭圆状卵形，稍凹陷，长2.5—3 cm，宽1.4—1.8 cm，背面被微柔毛，边缘具细缘毛；花瓣近平展，狭倒卵形至矩圆状匙形，长3.2—3.8 cm，宽1.4—1.8 cm，先端钝或具模糊的3小齿，边缘波状，具细缘毛；唇瓣盔状；囊椭圆形，长2.3—2.8 cm，宽2.2—2.5 cm，囊口两侧稍呈耳状；退化雄蕊倒心形或宽倒卵形，长7—9 mm，宽7—8 mm，上面具乳突和1个小脐状突起。2*n*=26。

花期：野外为9—11月。

分布：广西西南部、云南东南部；越南北部。

生境：石灰岩地区荫蔽岩壁缝隙中或常绿阔叶林和灌木林中多石或排水良好之地；海拔900—1300 m。

说明：这是一个在花的色泽和花瓣形状方面变化较大的种。中萼片和花瓣上紫褐色或黑紫色斑点的数目和大小在个体之间有明显不同，有时甚至变成貌似疣状突起或消失不见了。

该种与紫毛兜兰 (*P. villosum*) 之间的天然杂种: 中华紫毛兜兰 (杂种) (*Paphiopedilum* × *sinovillosum* Z. J. Liu & S. C. Chen) [华南农业大学学报25 (4): 123. 2004] 发现于我国云南东南部。此外, Braem在1991年曾描述一个新变种 *var. christae*, 该变种中萼片与花瓣上缺少浓密的斑点。他在1999年又将它降级为克列变型 *f. christae*。另一个实体赵氏兜兰 *P. chaoi* 是根据中萼片上不具浓密的斑点, 和花瓣上有较密和较小的斑点而建立的。Averyanov 等人 (2003) 承认 *f. christae*, 而将 *P. chaoi* 归并作为 *P. henryanum* 的异名。但我们认为, *P. chaoi* 在花的色泽上同样与 *P. henryanum* 有明显的不同, 以作为它的变型为宜。

Terrestrial or lithophytic plants. Leaves 3–6, coriaceous, narrowly oblong, 12–23 cm long, 1.1–1.8 (–2.4) cm wide, unequally bilobulate or minutely tridenticulate at apex, adaxially deep green or sometimes with narrow yellow-white margins, abaxially pale green or sometimes with purple-brown markings at the very base. Scape arching or suberect, 14–17 cm long, green to brownish-green, brown-purple-pubescent; bract broadly ovate, 2–3.2 cm long, 0.6–1.8 cm wide, green, with purple-brown spots; pedicel and ovary 3.5–4 cm long, purple-brown-pubescent; flower single, 6–7 cm across; dorsal sepal pale yellow-green to dull yellow, with large purple-brown spots; synsepal similar in color to dorsal sepal, with much fewer spots; petals pink-purple to light purple-red, with large dark purple or blackish-purple spots in basal half or throughout; lip pink-purple or light purple-red, with a pale yellow rim; staminode pale yellow slightly flushed with pale purple or brownish, with a green or brown-yellow umbo; dorsal sepal usually erect, broadly ovate to suborbicular-ovate, 3–3.5 cm long, 3.2–3.8 cm wide, obtuse at apex, undulate-margined, minutely ciliate, basal margins recurved, abaxially puberulous; synsepal elliptic-ovate, slightly concave, 2.5–3 cm long, 1.4–1.8 cm wide, abaxially puberulous, minutely ciliate; petals almost spreading horizontally, narrowly obovate to oblong-spatulate, 3.2–3.8 cm long, 1.4–1.8 cm wide, obtuse or obscurely tridenticulate at apex, undulate-margined, minutely ciliate; lip helmet-shaped; pouch ellipsoid, 2.3–2.8 cm long, 2.2–2.5 cm wide, slightly auriculate on both sides of its mouth; staminode obcordate or broadly obovate, 7–9 mm long, 7–8 mm wide, papillose and with a small umbo adaxially. $2n=26$.

Flowering period: September to November in the wild.

Distribution: SW Guangxi, SE Yunnan; N Vietnam.

Habitat: In crevices of shady cliffs or rocky and well-drained places in evergreen broad-leaved forests or thickets in limestone areas at an altitude of 900–1300 m.

Note: This is a variable species in its floral coloration and petal shape. The purple-brown or blackish-purple spots on the dorsal sepal and petals conspicuously vary in number and size from plant to plant, sometimes even becoming wart-like or disappearing.

Paphiopedilum × *sinovillosum* Z. J. Liu & S. C. Chen [in J. South China Agric. Univ. 25(4): 123. 2004], a natural hybrid of this species and *P. villosum*, was described from

Southeast Yunnan of China. Besides, Braem described a variety, var. *christae*, in 1991 which lacks the heavy spotting on the dorsal sepal and petals. He reduced it to a lower rank, f. *christae*, in 1999. Another entity, *P. chaoi*, was established based on a plant lacking heavy spotting on the dorsal sepal and having rather dense and smaller spots on the petals. Averyanov et al. (2003) recognized f. *christae*, and treated *P. chaoi* as a synonym of *P. henryanum*. In our opinion, however, *P. chaoi* also shows a pronounced difference in flower colors from *P. henryanum*, and is here treated as a form of it.

赵氏变型 改级新组合

Paphiopedilum henryanum Braem f. **chaoi** (S. Hua Hu) Z. J. Liu & S. C. Chen, comb. et stat. nov. **Type:** China, Guangxi, Napo county, M. H. Chao 5322 (holotype, IBSC).
Paphiopedilum chaoi S. Hua Hu in Die Orchidee 50 (5) : 495. 1999.

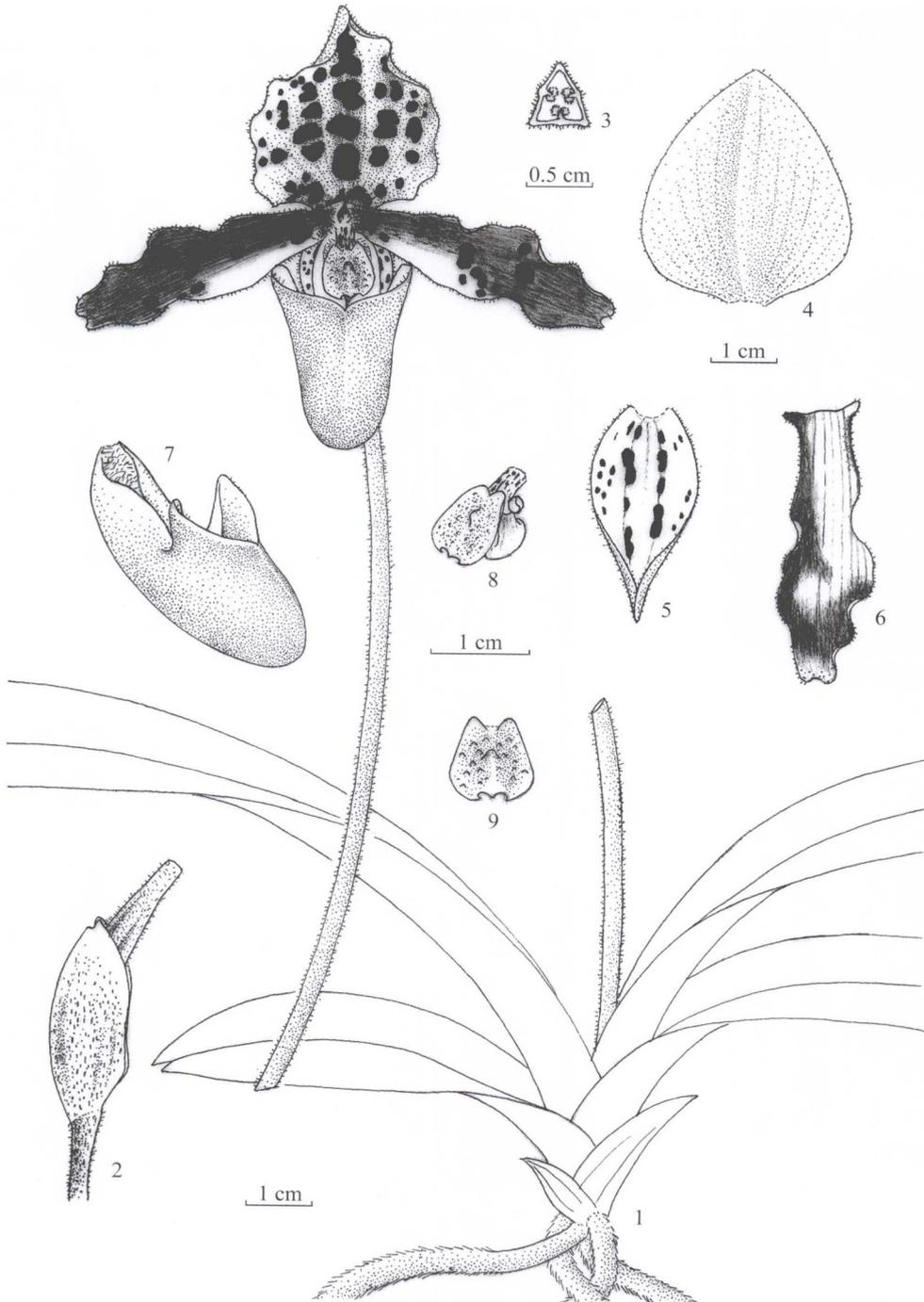


图 5-59. 亨利兜兰: 1. 带花植株; 2. 苞片和子房; 3. 子房横切面; 4. 中萼片, 背面观; 5. 合萼片, 正面观; 6. 花瓣, 背面观; 7. 唇瓣, 侧面观; 8. 蕊柱; 9. 退化雄蕊
 Fig. 5-59. *Paphiopedilum henryanum*: 1. Flowering plant; 2. Bract and ovary; 3. Ovary cross section; 4. Dorsal sepal, back view; 5. Synsepal, front view; 6. Petal, back view; 7. Lip, side view; 8. Column; 9. Staminode

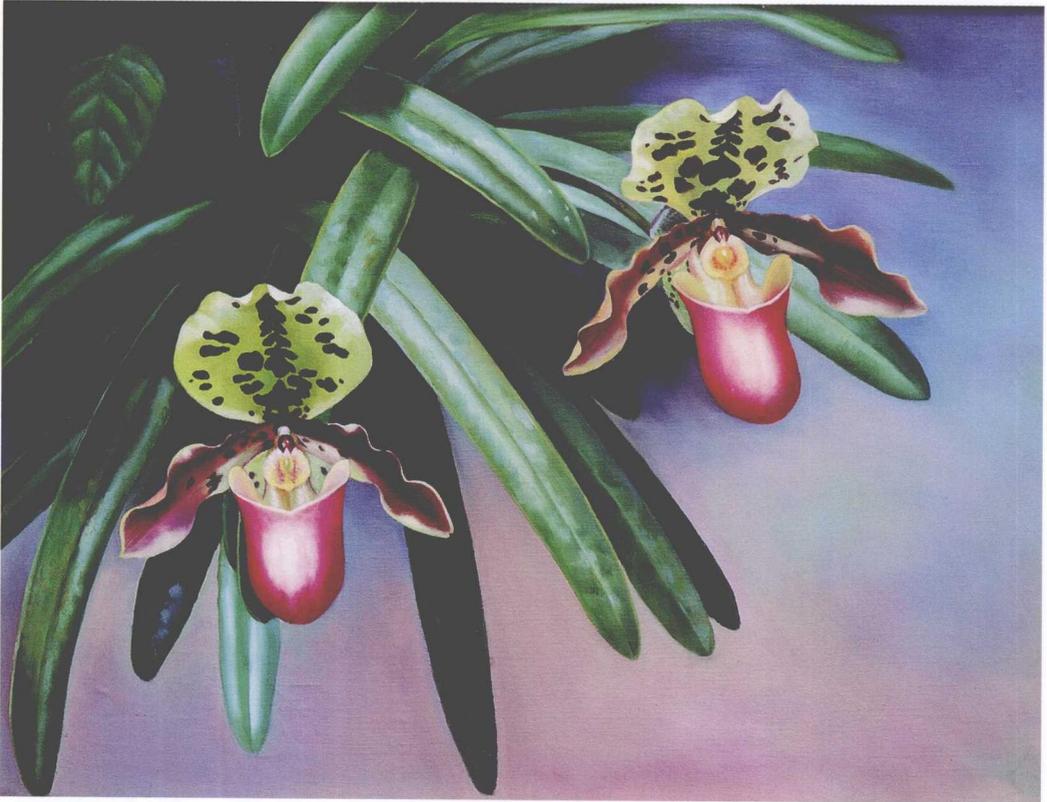


图 5-60. 亨利兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花

Fig. 5-60. *Paphiopedilum henryanum*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan



图 5-61. 亨利兜兰: a. 在广西西南部野外开花; b. 在栽培中开花
Fig. 5-61. *Paphiopedilum henryanum*: a. Flowering in the wild in Southwest Guangxi; b. Flowering in cultivation



图版 13. 亨利兜兰
Plate 13. *Paphiopedilum henryanum*

油画 作者: 李丝云
Oil painting by Si -yun Li

18. 格力兜兰 (图5-62, 63; 图版14) (Fig. 5-62, 63; Pl. 14)

Paphiopedilum gratrixianum Rolfe in Orchid Rev. 13: 63. 1905; Guill. in Bull. Soc. Bot. France 71: 556. 1924; Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 59. 1982; P. J. Cribb, Gen. Paphiopedilum: 146. 1987, et Gen. Paphiopedilum (ed. 2): 249. 1998; Seidenf. in Opera Bot. 114: 17. 1992; Braem, C. Baker & M. Baker, Genus Paphiopedilum Nat. Hist. Cult. 2: 236. 1999; Aver. et al., Slipper Orch. Vietnam: 199. 2003. **Type:** Vietnam, Annam, Micholitz s. n., cult. Sander (holotype, K!).

Cypripedium gratrixianum Masters in Gard. Chron. ser. 3, 37: 76, fig. 35. 1905, nom. inval., non Williams 1897.

Paphiopedilum affine De Wild. in Tribune Hort. 1: 57. 1906.

Cordula gratrixiana (Rolfe) Rolfe in Orchid Rev. 20 (1): 2. 1912.

Paphiopedilum villosum (Lindl.) Stein var. *gratrixianum* (Rolfe) Braem, Paphiopedilum: 119. 1988.

Paphiopedilum villosum (Lindl.) Stein var. *affine* (De Wild.) Braem, Paphiopedilum: 119. 1988.

地生或石上附生植物。叶4—8枚，二列，倒披针状矩圆形至狭矩圆形，长28—40 cm，宽2.6—3.4 cm，革质，先端不等的2浅裂或具3小齿，上面深绿色，背面绿色，近基部具紫色斑点。花葶近直立，长17—32 cm，绿色，被紫色短柔毛；苞片近椭圆状卵形，长3.5—4.7 cm，宽2—2.5 cm，绿色，近背面基部被紫色短柔毛；花梗和子房长5—6.5 cm，被紫色短柔毛；花单朵，直径7—8 cm；中萼片白色，近基部常为浅绿色或浅褐绿色，从基部向上2/3处具深紫色斑点；合萼片白色，中央常具2行紫色斑点；花瓣黄褐色，中脉上侧的色泽较下侧为深；唇瓣浅黄褐色；退化雄蕊浅黄色，稍有浅褐色晕；中萼片宽椭圆形或近圆形，长5—5.5 cm，宽3.8—4.6 cm，基部边缘外弯，先端急尖，边缘具缘毛，背面被微柔毛，沿中脉与基部毛较多；合萼片椭圆形或卵状椭圆形，长4.2—5 cm，宽2.2—2.7 cm，边缘具缘毛，背面稍被微柔毛；花瓣匙形，长5.2—5.5 cm，宽2—2.5 cm，先端微凹或具3小齿，边缘通常波状并外弯，具细缘毛，上面近基部被紫色长硬毛；唇瓣盔状；囊卵形，长2.8—3.1 cm，宽2.4—2.7 cm，囊口两侧略呈耳状；退化雄蕊倒心形，长、宽各10—11 mm，先端急尖，上面具泡状乳突和一个中央脐状突起，近基部有紫色毛。 $2n=26$ 。

花期：野外为9—12月。

分布：云南东南部（麻栗坡县）；老挝、越南北部。

生境：林下多石之地；海拔1800—1900 m。

说明：云南东南部曾发现该种与亨利兜兰（*P. henryanum*）之间的天然杂种：维腾兜兰（杂种）*P. × vietenryanum* Gruss & Petchl. [in Die Orchidee 53(2): 221. 2002]。此外，*P. affine* De Wild. 曾被认为是紫毛兜兰（*P. villosum*）和卷萼兜兰（*P. appletonianum*）之间的杂种（Cribb, 1998），而G. J. Braem先是在1988年将它作为紫毛兜兰的变种，后来在1999年又将它并入格力兜兰。由于De Wildeman在发表此新种

时没有附图，因此很难对其属性做出正确的判断。另一个事实是，紫毛兜兰与卷萼兜兰之间的一个真正的天然杂种：克列兜兰（杂种）（*P. × cribbii* Aver.），近来发现于越南南部。因此，*P. affine*在这里被作为该种的一个异名。

Terrestrial or lithophytic plants. Leaves 4–8, distichous, oblanceolate-oblong to narrowly oblong, 28–40 cm long, 2.6–3.4 cm wide, coriaceous, unequally bilobulate or tridenticulate at apex, adaxially deep green, abaxially green and with purple spots toward the base. Scape suberect, 17–32 cm long, green, purple-pubescent; bract subelliptic-ovate, 3.5–4.7 cm long, 2–2.5 cm wide, green, purple-puberulous toward abaxial base; pedicel and ovary 5–6.5 cm long, purple-pubescent; flower single, 7–8 cm across; dorsal sepal white, often pale green or pale brown-green toward its base, spotted with deep purple in basal two-thirds; synsepal white, often with 2 rows of purple spots centrally; petals yellow-brown, with deeper color on upper side of the midvein than on its lower side; lip pale yellow-brown; staminode pale yellow, slightly flushed with brown; dorsal sepal broadly elliptic or suborbicular, 5–5.5 cm long, 3.8–4.6 cm wide, basal margins recurved, acute at apex, ciliate, abaxially puberulous mainly along midvein and toward the base; synsepal elliptic or ovate-elliptic, 4.2–5 cm long, 2.2–2.7 cm wide, ciliate, slightly puberulous abaxially; petals spatulate, 5.2–5.5 cm long, 2–2.5 cm wide, retuse to tridentate at apex, often undulate and recurved-margined, minutely ciliate, purple-hirsute toward adaxial base; lip helmet-shaped; pouch ovoid, 2.8–3.1 cm long, 2.4–2.7 cm wide, slightly auriculate on both sides of its mouth; staminode obcordate, 10–11 mm long and wide, acute at apex, adaxially with bubble-like papillae and a central umbo, purple-hairy toward its base. $2n=26$.

Flowering period: September to December in the wild.

Distribution: SE Yunnan (Malipo county); Laos, N Vietnam.

Habitat: Rocky places in forests; alt. 1800–1900 m.

Note: A natural hybrid between this species and *P. henryanum*, *P. × vietenryanum* Gruss & Petchl. [in *Die Orchidee* 53(2): 221. 2002], was reported from southeastern Yunnan. In addition, *P. affine* De Wild. was considered by Cribb (1998) to be a hybrid between *P. villosum* and *P. appletonianum*, while it was treated by Braem as a variety of *P. villosum* in 1988 and then as conspecific with *P. gratixianum* in 1999. Because De Wildeman provided no drawing when he described the new species, it seems difficult to arrive at a correct judgement of its identity. Another fact is that *P. × cribbii* Aver., a true natural hybrid of *P. villosum* and *P. appletonianum*, was described from southern Vietnam recently. Therefore, *P. affine* is treated here as a synonym of this species.

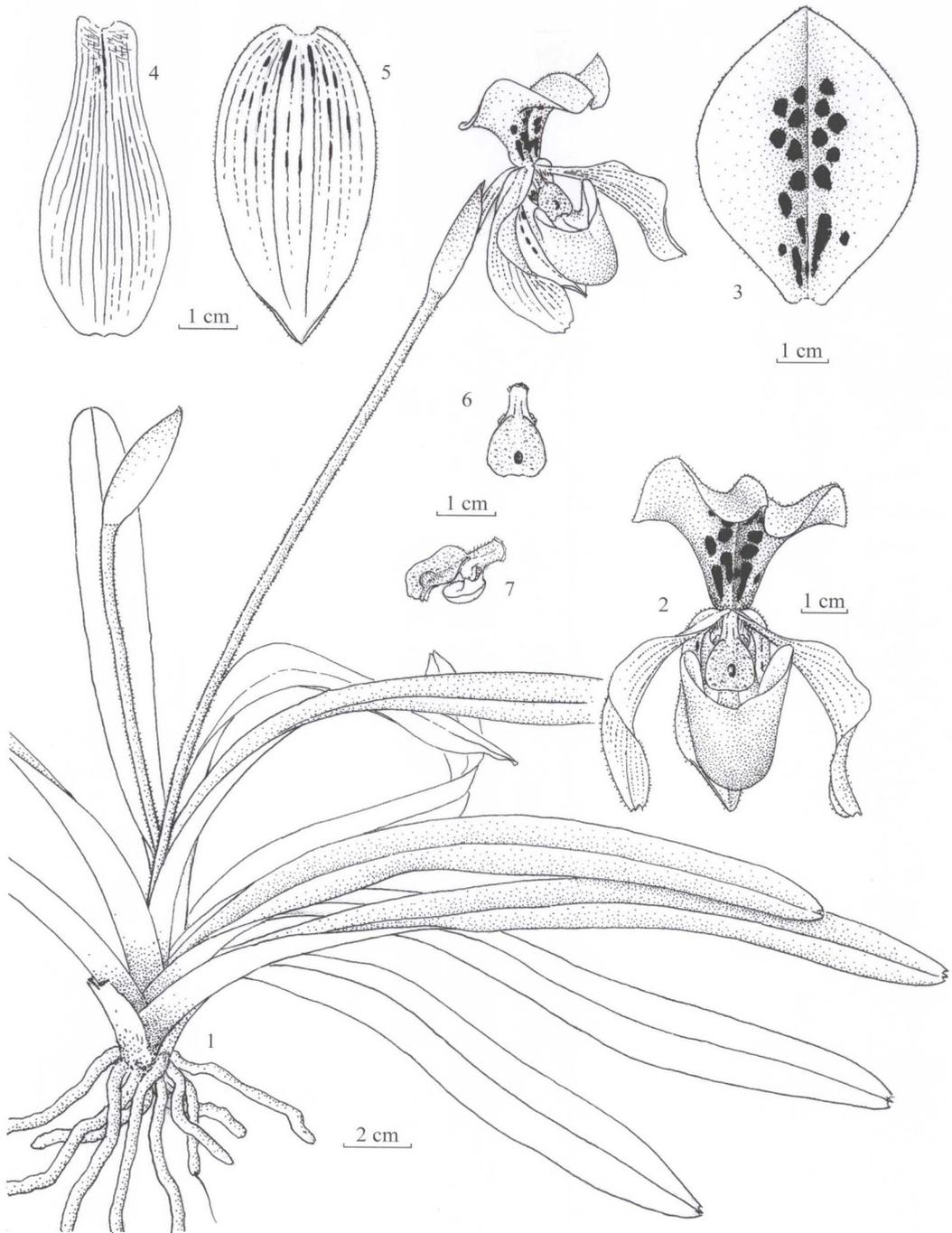


图 5-62. 格力兜兰: 1. 带花植株; 2. 花; 3. 中萼片; 4. 花瓣; 5. 合萼片; 6. 蕊柱, 正面观; 7. 蕊柱, 侧面观

Fig. 5-62. *Paphiopedilum gratixianum*: 1. Flowering plant; 2. Flower; 3. Dorsal sepal; 4. Petal; 5. Synsepal; 6. Column, front view; 7. Column, side view

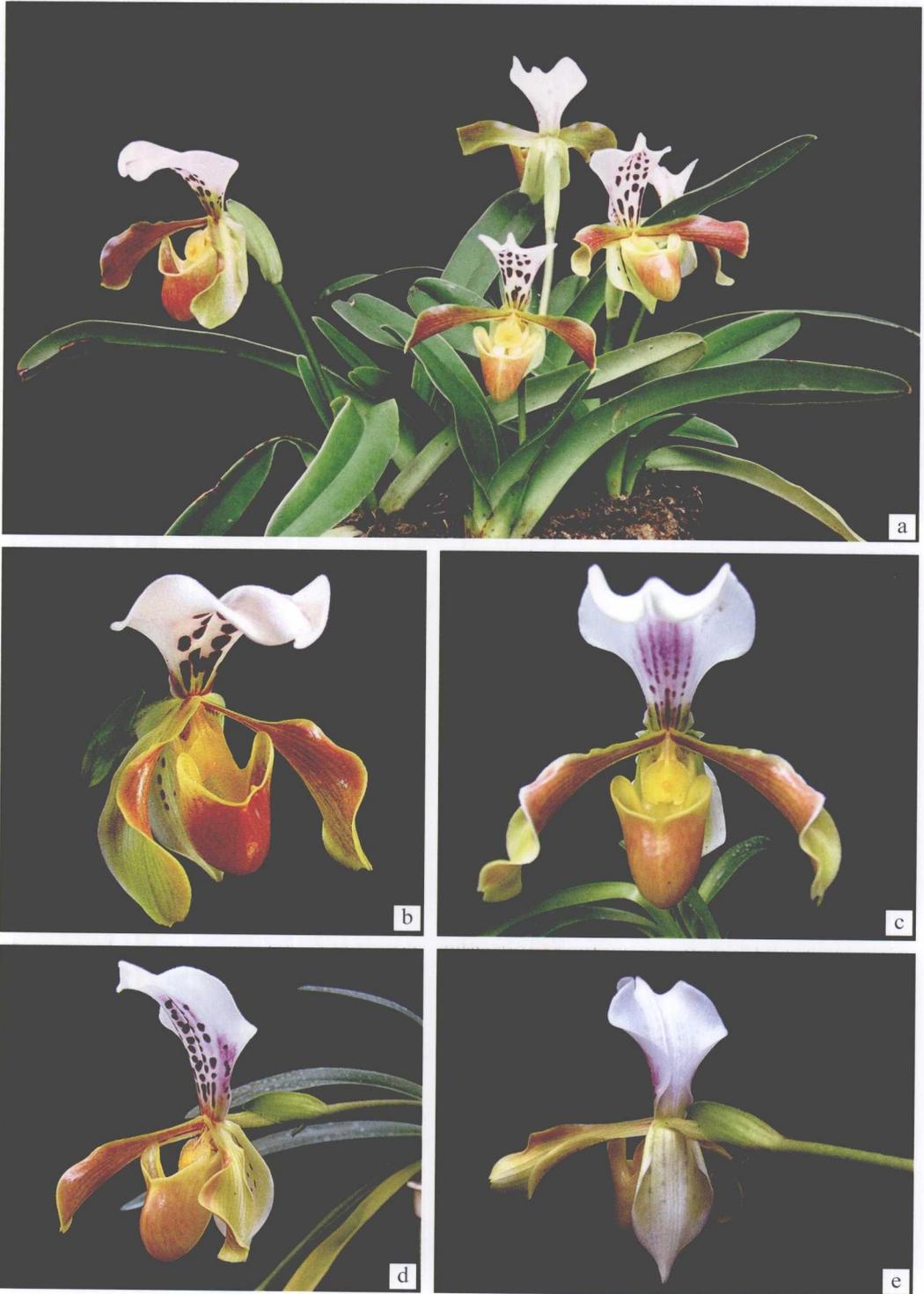
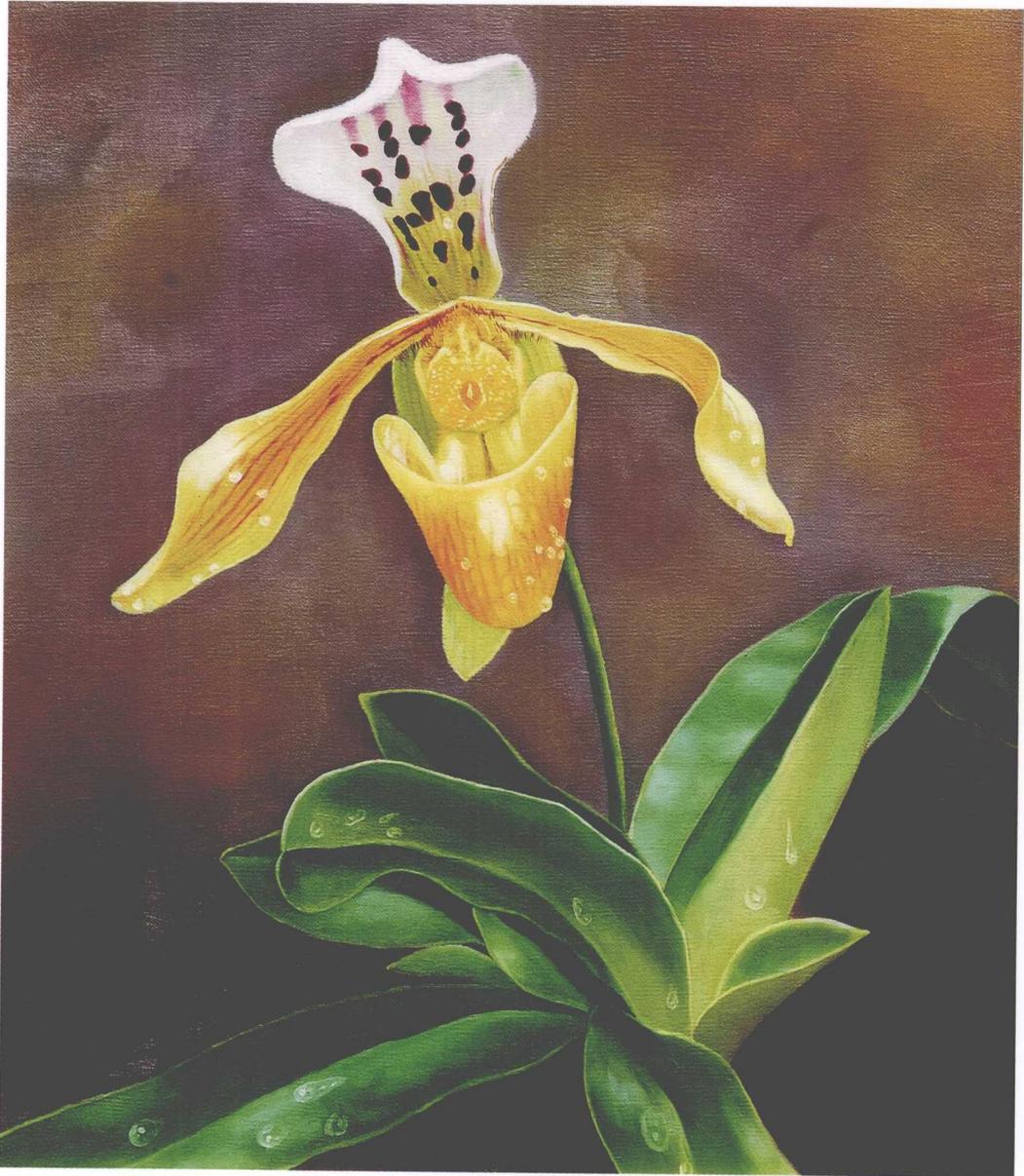


图 5-63. 格力兜兰: a-e. 在栽培中开花
Fig. 5-63. *Paphiopedilum gratrixianum*; a-e. Flowering in cultivation



图版 14. 格力兜兰
Plate 14. *Paphiopedilum gratrixianum*

油画 作者: 李丝云
Oil painting by Si -yun Li

19. 紫毛兜兰

Paphiopedilum villosum (Lindl.) Stein, Orchideenbuch: 490. 1892; Pfitzer in Bot. Jahrb. Syst. 19: 41. 1894, et in Engler, Pflanzenreich IV(50) Heft 12: 72. 1903; Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 41. 1982; P. J. Cribb, Gen. Paphiopedilum: 150. 1987, et Gen. Paphiopedilum (ed. 2): 254. 1998; Braem, Paphiopedilum: 115. 1988; S. C. Chen & Z. H. Tsi, Orch. China: 126. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 242. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 339. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 67. 1999. **Type:** Myanmar, Lobb s. n. (holotype, K!).

Cypripedium villosum Lindl. in Gard. Chron.: 135. 1854.

Cordula villosa (Lindl.) Rolfe in Orch. Rev. 20: 2. 1912.

Paphiopedilum macranthum Z. J. Liu & S. C. Chen in Acta Bot. Yunnan. 24 (6): 712. 2002.

Type: Cambodia? Z. J. Liu 21116 (holotype, NOCC!).

紫毛兜兰是一个变异性甚大的种，特别是在花的色泽方面。总共有6个变种和1个变型被描述。本书承认4个变种（见下文）。另外2个变种，即褐红变种（var. *fuscroseum* Aver.）（2002）与褐绿变种（var. *fuscoviride* Aver.）（2002），我们认为最好降为变型。再加上黄花变型（f. *aureum* Braem）（1998），总共已知有3个变型。

P. villosum is a highly variable species, especially in floral coloring. There are altogether six varieties and one form known to us. In our book, four varieties are recognized (see below). The other two varieties, namely var. *fuscroseum* Aver.(2002) and var. *fuscoviride* Aver.(2002), are best treated as forms in our opinion. Thus, there are three forms, including f. *aureum* Braem (1998).

变种检索表

- 1. 中萼片具显目的黑栗色粗斑点.....19d. 包氏兜兰（变种）*P. villosum* var. *boxallii*
- 1. 中萼片不具黑栗色粗斑点。
 - 2. 中萼片具宽阔的白色边缘，尤其上半部.....
.....19c. 安南兜兰（变种）*P. villosum* var. *annamense*
 - 2. 中萼片具浅黄色、浅绿色或绿色边缘。
 - 3. 花序柄和子房被极密的白色长柔毛；中萼片宽2.2—2.9 cm，背面近顶端、基部以及沿中脉密被白色短柔毛...19b. 密毛兜兰（变种）*P. villosum* var. *densissimum*
 - 3. 花序柄和子房被紫色长柔毛；中萼片宽3.5—4.5 cm，背面略被细毛.....
.....19a. 紫毛兜兰（原变种）*P. villosum* var. *villosum*

Key to the varieties

1. Dorsal sepal boldly spotted with blackish-maroon19d. *P. villosum* var. *boxallii*
1. Dorsal sepal not spotted with blackish-maroon.
2. Dorsal sepal with a broad white margin particularly in apical half.....
.....19c. *P. villosum* var. *annamense*
2. Dorsal sepal with a pale yellow, pale green or green margin.
3. Peduncle and ovary very densely white-villose; dorsal sepal 2.2–2.9 cm wide, abaxially densely white-pubescent toward its apex and base and along the midvein
.....19b. *P. villosum* var. *densissimum*
3. Peduncle and ovary purple-villose; dorsal sepal 3.5–4.5 cm wide, abaxially slightly minute-hairy19a. *P. villosum* var. *villosum*

19a. 紫毛兜兰 (原变种) (图5-64, 65, 66) (Fig. 5-64, 65, 66)

Paphiopedilum villosum var. *villosum*

树上附生或有时石上附生植物。叶4–6枚，狭矩圆形或带形，长20–40 cm，宽2.2–4 cm，革质，先端急尖或钝并有2浅裂，上面暗绿色，背面绿色并在近基部具紫色斑点。花萼外弯或近直立，长12–27 cm，绿色，常具紫色斑点，被紫色长毛；苞片椭圆形，长4–6 cm，宽2–3 cm，绿色，背面具紫色斑点；花梗和子房长4–5 cm，被紫色长柔毛；花单朵，直径8–13 cm；中萼片浅绿色、浅黄色或绿色，中央区深栗色并具深色条纹；合萼片浅绿色至浅黄色；花瓣具1条深栗色中脉，中脉上侧浅栗色并具深栗色脉纹，中脉下侧色泽较浅；唇瓣浅栗色，具模糊的深色脉；退化雄蕊浅黄绿色，略有浅栗色晕，具黄色或绿色脐状突起；中萼片宽椭圆形至倒卵形，长4–6.5 cm，宽3.5–4.5 cm，基部边缘外弯，先端钝，边缘具缘毛，背面稍被细毛；合萼片椭圆状卵形，通常长4–5 cm，宽1.7–2.8 cm；花瓣匙状倒卵形，长5–7 cm，宽2.5–4.5 cm，先端钝或微凹，边缘具缘毛，上面基部具紫色长柔毛；唇瓣盔状；囊卵形，长2.5–4.5 cm，宽2.5–3.5 cm，囊口两侧明显呈耳状；退化雄蕊倒心状倒卵形，长10–15 mm，宽9–13 mm，上面具乳突、长硬毛和1个中央脐状突起。
 $2n=26$ 。

花期：野外为11月至翌年3月。

分布：广西西部（都安县）、云南东南部至西南部；印度东北部、老挝、缅甸、泰国。

生境：疏林中树上或岩石上；海拔1800–2200 m。

Epiphytic or sometimes lithophytic plants. Leaves 4–6, narrowly oblong or lorate, 20–40 cm long, 2.2–4 cm wide, coriaceous, acute or obtuse and bilobulate at apex, adaxially dark green, abaxially green and spotted with purple toward the base. Scape arching to suberect,

12–27 cm long, green, often spotted with purple, covered with long purple hairs; bract elliptic, 4–6 cm long, 2–3 cm wide, green, abaxially purple-spotted; pedicel and ovary 4–5 cm long, purple-villose; flower single, 8–13 cm across; dorsal sepal pale green, pale yellow or green, with a deep maroon and deeper-stripped central area; synsepal pale green to pale yellow; petals with a deep maroon midvein, its upper side pale maroon veined with deep maroon and its lower side paler in color; lip pale maroon obscurely with deeper veins; staminode pale yellow slightly flushed with pale maroon, with a yellow or green umbo; dorsal sepal broadly elliptic to obovate, 4–6.5 cm long, 3.5–4.5 cm wide, recurved on basal margins, obtuse at apex, ciliate, abaxially slightly minute-hairy; synsepal elliptic-ovate, usually 4–5 cm long, 1.7–2.8 cm wide; petals spatulate-obovate, 5–7 cm long, 2.5–4.5 cm wide, obtuse to retuse at apex, ciliate, purple-villose at adaxial base; lip helmet-shaped; pouch ovoid, 2.5–4.5 cm long, 2.5–3.5 cm wide, conspicuously auriculate on both sides of its mouth; staminode obcordate-obovate, 10–15 mm long, 9–13 mm wide, adaxially papillose, hirsute and with a central umbo. $2n=26$.

Flowering period: November to March in the wild.

Distribution: W Guangxi (Duan county), SE to SW Yunnan; NE India, Laos, Myanmar, Thailand.

Habitat: On trees or rocks in open forests; alt. 1800–2200 m.

19b. 密毛兜兰 (变种) (图5-67, 68, 69) (Fig. 5-67, 68, 69)

Paphiopedilum villosum var. **densissimum** (Z. J. Liu & S. C. Chen) Z. J. Liu & S. C. Chen, comb. et stat. nov. **Type:** China, Yunnan, cult., Z. J. Liu 21128 (holotype, PE!; isotype, NOCC!).

Paphiopedilum densissimum Z. J. Liu & S. C. Chen in Acta Phytotax. Sin. 40 (3): 283. 2002.

该变种与紫毛兜兰 (原变种) (*P. villosum* var. *villosum*) 的区别在它的花序柄与子房被极密的白色长柔毛; 毛长2–3 (–5) mm; 中萼片较狭, 宽2.2–2.9 cm, 基部边缘几乎不外弯, 背面近顶端、基部以及沿中脉密被白色短柔毛。

花期: 野外为9–11月。

分布: 云南南部与西南部 (墨江县和盈江县?)。

生境: 沿干热山谷旁林下或灌木林中岩石上或悬岩壁上; 海拔800–900 m。

说明: 此分类群是基于从云南西南部一个苗圃引入栽培的植物发表的。据说是采自盈江地区, 但我们未能在野外找到它。一直到最近才在墨江县的一个干热河谷中采到。

This variety differs from the typical variety (*P. villosum* var. *villosum*) by its peduncle and ovary very densely covered with white long hairs 2–3(–5) mm long, narrower dorsal sepal 2.2–2.9 cm wide with its basal margins almost not recurved and abaxially densely white-pubescent toward its apex and base and along midvein.

Flowering period: September to November in the wild.

Distribution: S to SW Yunnan (Mojiang county and Yingjiang county ?).

Habitat: On rocks in forests or thickets or on cliffs along dry and hot valleys at an elevation of 800–900 m.

Note: This taxon was described based on cultivated plants introduced from a nursery in southwestern Yunnan. It was said that the plants were collected from Yingjiang region, but we failed to discover them there. Until very recently this variety was found in Mojiang county where it was seen along a dry and hot valley.

19c. 安南兜兰 (变种) (图5-70, 71) (Fig. 5-70, 71)

Paphiopedilum villosum var. **annamense** Rolfe in Curtis's Bot. Mag. 133: t. 8126. 1907; P. J. Cribb, Gen. Paphiopedilum (ed. 2): 260. 1998; Aver. et al., Slipper Orch. Vietnam: 215. 2003. **Lectotype**: Vietnam, Annam, Micholitz s. n., cult. Sander (holotype, Curtis's Bot. Mag. 133: t. 8126).

Paphiopedilum villosum f. *annamense* (Rolfe) Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 245. 1999.

该变种与紫毛兜兰 (原变种) (*P. villosum* var. *villosum*) 的区别在于中萼片有宽阔的白色边缘, 特别在上半部。

花期: 野外为7月 (在越南为4–5月)。

分布: 云南东南部 (麻栗坡县); 老挝、越南。

生境: 多雾森林中树上; 海拔约2200 m。

This variety differs from the typical variety (*P. villosum* var. *villosum*) by its dorsal sepal with a broad white margin particularly in apical half.

Flowering period: July (April and May in Vietnam) in the wild.

Distribution: SE Yunnan (Malipo county); Laos, Vietnam.

Habitat: On trees in cloudy forests at an elevation of ca. 2200 m.

19d. 包氏兜兰 (变种) (图5-72, 73) (Fig. 5-72, 73)

Paphiopedilum villosum var. **boxallii** (Rchb. f.) Pfitzer in Engler, Pflanzenreich IV (50) Heft 12: 73. 1903; Braem, Paphiopedilum: 118. 1988; P. J. Cribb, Gen. Paphiopedilum (ed. 2): 259. 1998; Aver. et al., Slipper Orch. Vietnam: 217. 2003. **Type**: Myanmar, Moulmein, Boxall s. n. (holotype, W).

Cypripedium boxallii Rchb. f. in Gard. Chron. n. s. 7: 367. 1877.

Cypripedium dilectum Rchb. f. in Gard. Chron. ser. 3, 3: 330. 1888. **Type**: cult. Low (holotype, W).

Paphiopedilum boxallii (Rchb. f.) Pfitzer in Engler & Prantl, Nat. Pflanzenf. II, 6: 83. 1888.

Cypripedium villosum Lindl. var. *boxallii* (Rchb. f.) Veitch, Man. 4: 54. 1889.

Paphiopedilum dilectum (Rchb. f.) Pfitzer in Bot. Jahrb. Syst. 19: 40. 1894.

Cordula boxallii (Rchb. f.) Rolfe in Orchid Rev. 20: 2. 1912.

该变种与紫毛兜兰（原变种）（*P. villosum* var. *villosum*）的区别在于中萼片具黑栗色的粗斑点。2n=26。

花期：野外为12月。

分布：云南西南部（盈江县）；缅甸、越南北部。

生境：林中树干上；海拔约1800 m。

This variety differs from the typical variety (*P. villosum* var. *villosum*) by its dorsal sepal boldly spotted with blackish-maroon. 2n=26.

Flowering period: December in the wild.

Distribution: SW Yunnan (Yingjiang county); Myanmar, N Vietnam.

Habitat: On tree trunks in forests; alt. ca. 1800 m.

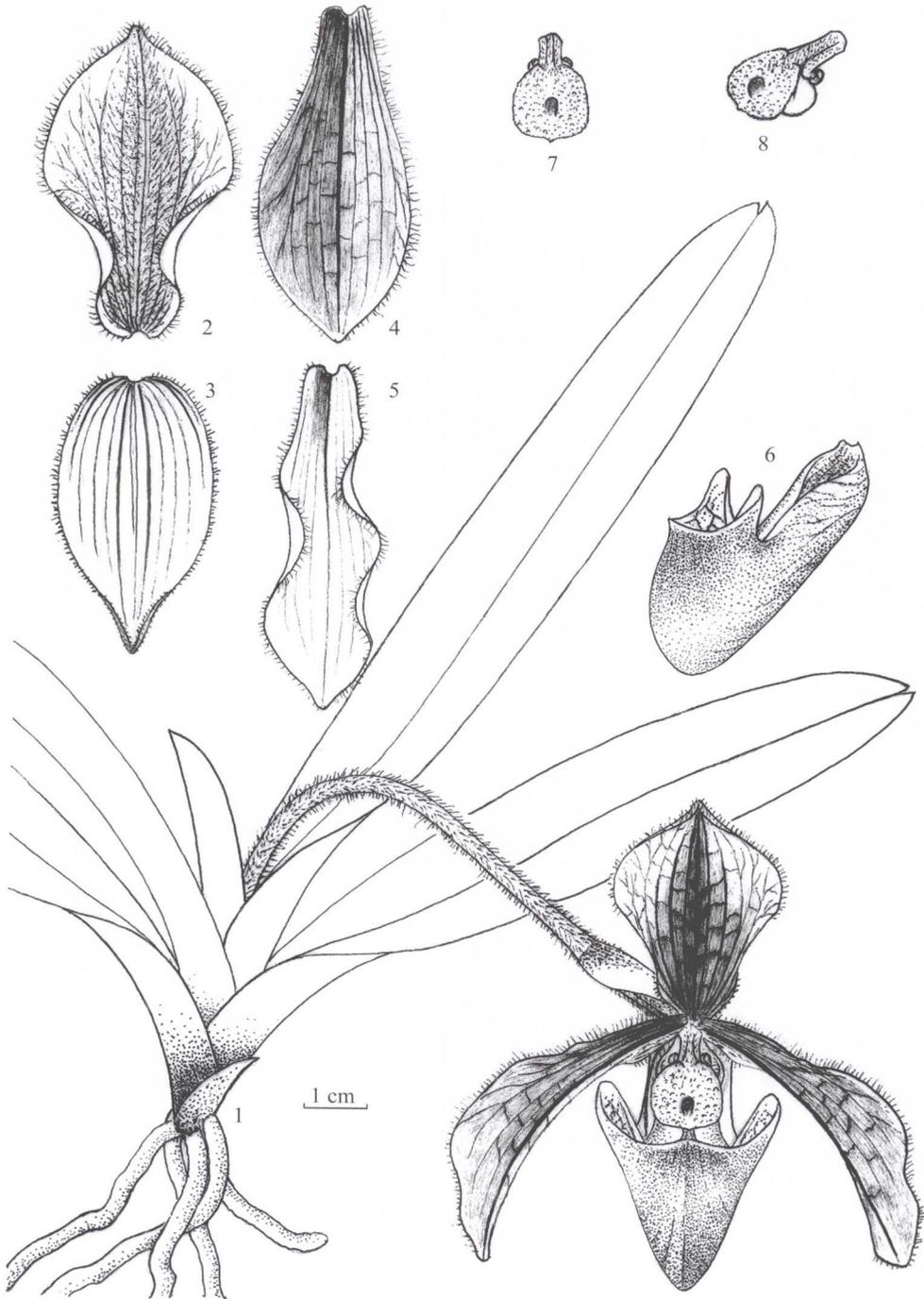


图 5-64. 紫毛兜兰 (原变种): 1.带花植株; 2.中萼片; 3.合萼片; 4.花瓣, 正面观; 5.花瓣, 背面观; 6.唇瓣, 侧面观; 7.蕊柱, 正面观; 8.蕊柱, 侧面观

Fig. 5-64. *Paphiopedilum villosum* var. *villosum*: 1. Flowering plant; 2. Dorsal sepal; 3. Synsepal; 4. Petal, front view; 5. Petal, back view; 6. Lip, side view; 7. Column, front view; 8. Column, side view



图 5-65. 紫毛兜兰 (原变种): a. 在云南东南部的自然生境; b. 生于云南东南部疏林中的巨大树枝上

Fig. 5-65. *Paphiopedilum villosum* var. *villosum*: a. Its natural habitat in Southeast Yunnan; b. Growing on large branches in open forest in Southeast Yunnan

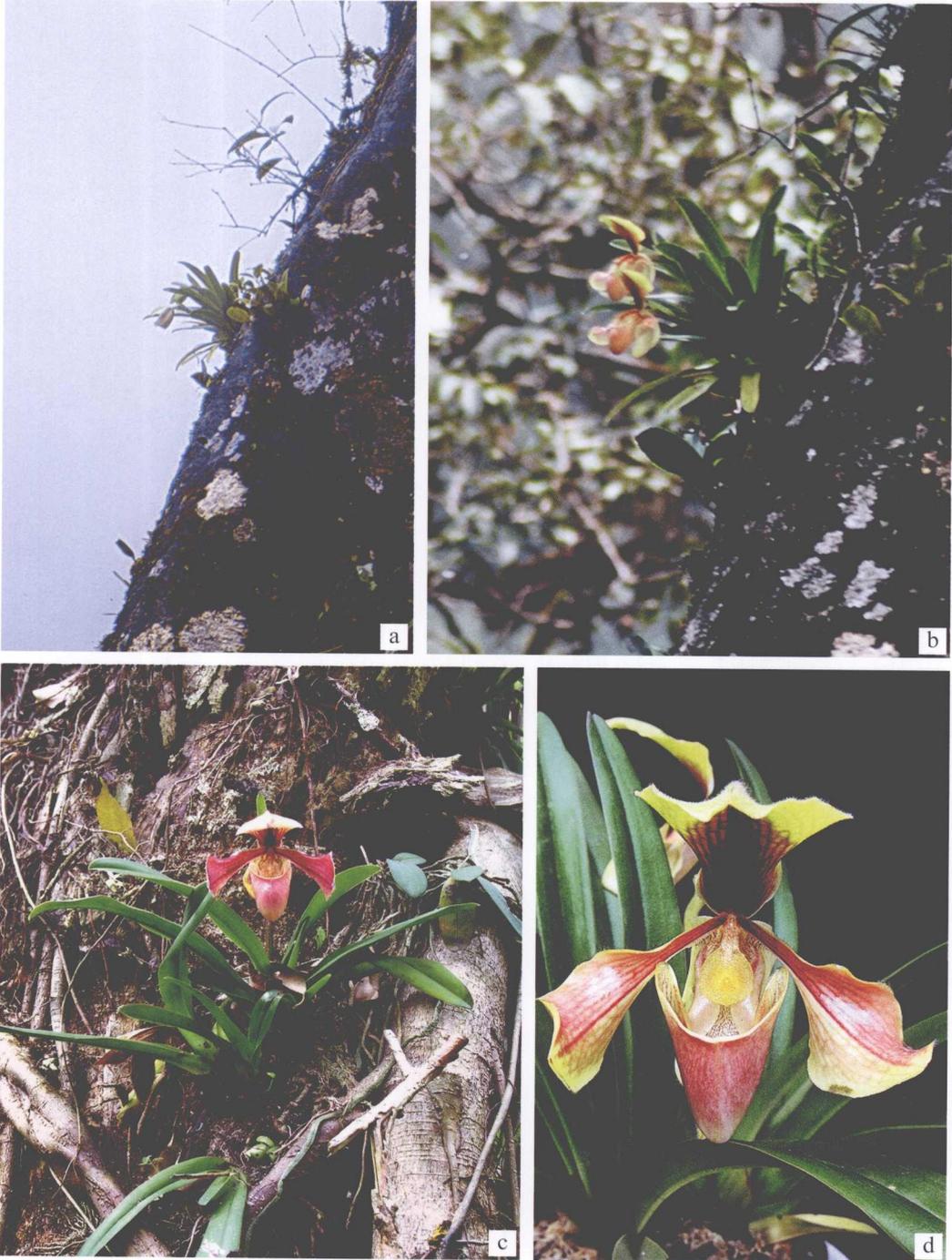


图 5-66. 紫毛兜兰（原变种）：a, b. 生于云南东南部自然生境中的树干上；c. 生于云南东南部自然生境中由树枝和树皮形成的凹陷处；d. 在栽培中开花

Fig. 5-66. *Paphiopedilum villosum* var. *villosum*: a, b. Growing on tree trunk in its natural habitat in Southeast Yunnan; c. Growing in a hollow formed by branches and barks in its natural habitat in Southeast Yunnan; d. Flowering in cultivation

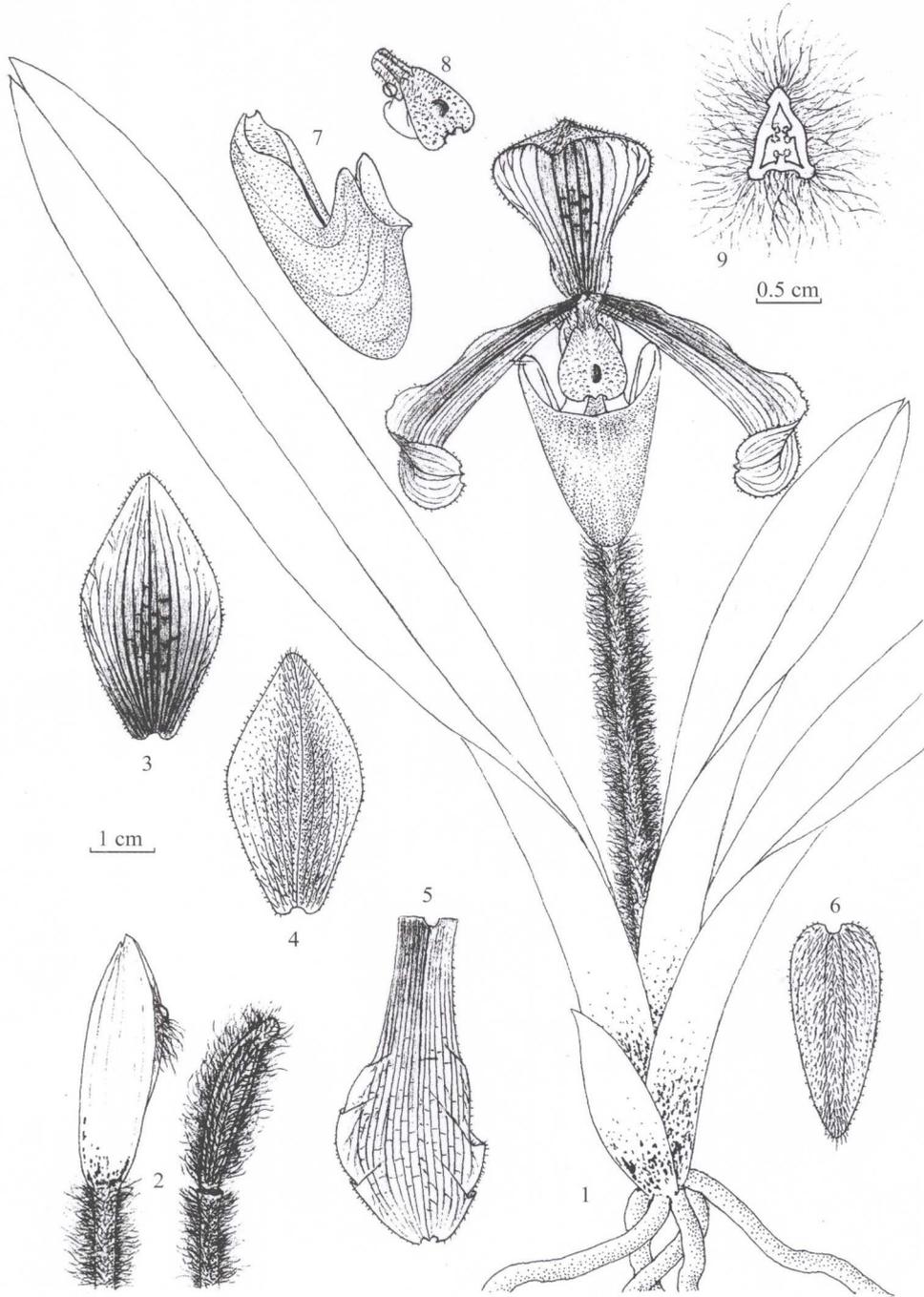


图 5-67. 密毛兜兰 (变种): 1. 带花植株; 2. 苞片与子房; 3. 中萼片, 正面观; 4. 中萼片, 背面观; 5. 花瓣, 背面观; 6. 合萼片, 背面观; 7. 唇瓣, 侧面观; 8. 蕊柱; 9. 子房横切面
 Fig. 5-67. *Paphiopedilum villosum* var. *densissimum*: 1. Flowering plant; 2. Bract and ovary; 3. Dorsal sepal, front view; 4. Dorsal sepal, back view; 5. Petal, back view; 6. Synsepal, back view; 7. Lip, side view; 8. Column; 9. Ovary cross section



图 5-68. 密毛兜兰 (变种): a. 在云南南部的自然生境; b. 在云南南部的悬崖草丛中开花
Fig. 5-68. *Paphiopedilum villosum* var. *densissimum*: a. Its natural habitat in southern Yunnan; b. Flowering on grassy cliff in southern Yunnan

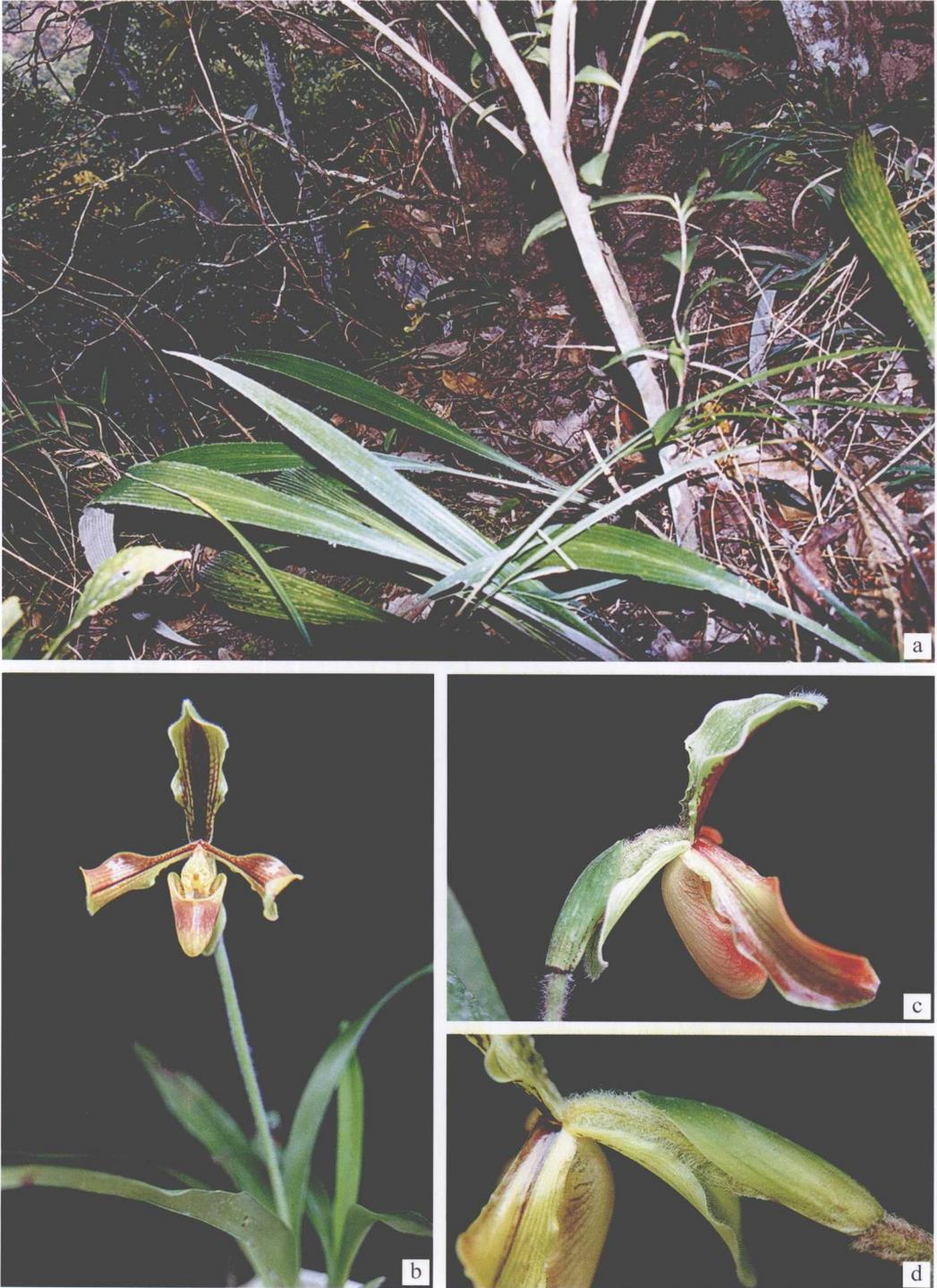


图 5-69. 密毛兜兰 (变种): a. 生于云南南部自然生境中; b-d. 在栽培中开花
Fig. 5-69. *Paphiopedilum villosum* var. *densissimum*: a. Growing in its natural habitat in southern Yunnan;
b-d. Flowering in cultivation

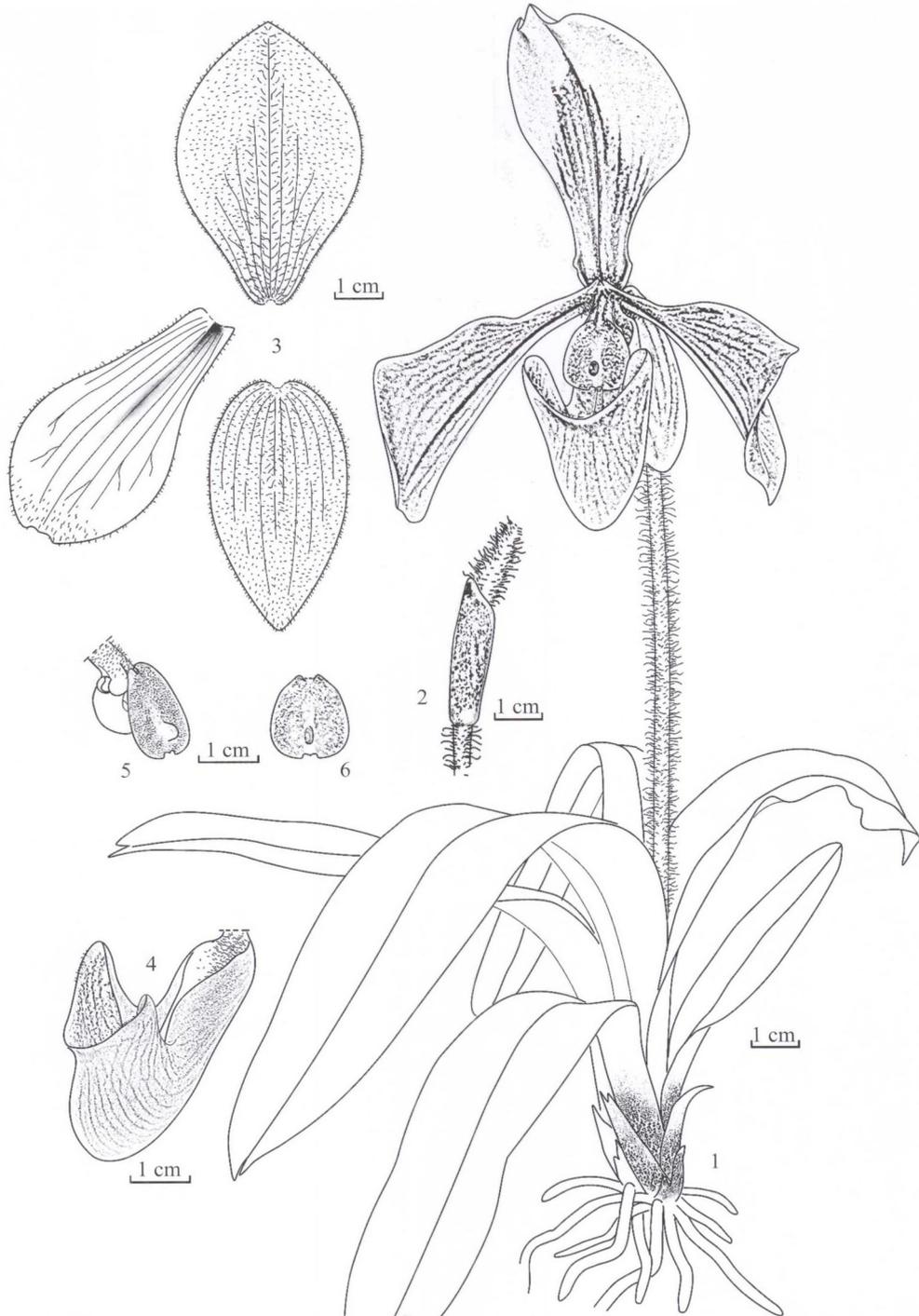


图 5-70. 安南兜兰 (变种): 1. 带花植株; 2. 苞片和子房; 3. 中萼片、花瓣与合萼片, 背面观; 4. 唇瓣, 侧面观; 5. 蕊柱; 6. 退化雄蕊

Fig. 5-70. *Paphiopedilum villosum* var. *annamense*: 1. Flowering plant; 2. Bract and ovary; 3. Dorsal sepal, petal and synsepal, back view; 4. Lip, side view; 5. Column; 6. Staminode



图 5-71. 安南兜兰 (变种): a-e. 在栽培中开花

Fig. 5-71. *Paphiopedilum villosum* var. *annamense*: a-e. Flowering in cultivation

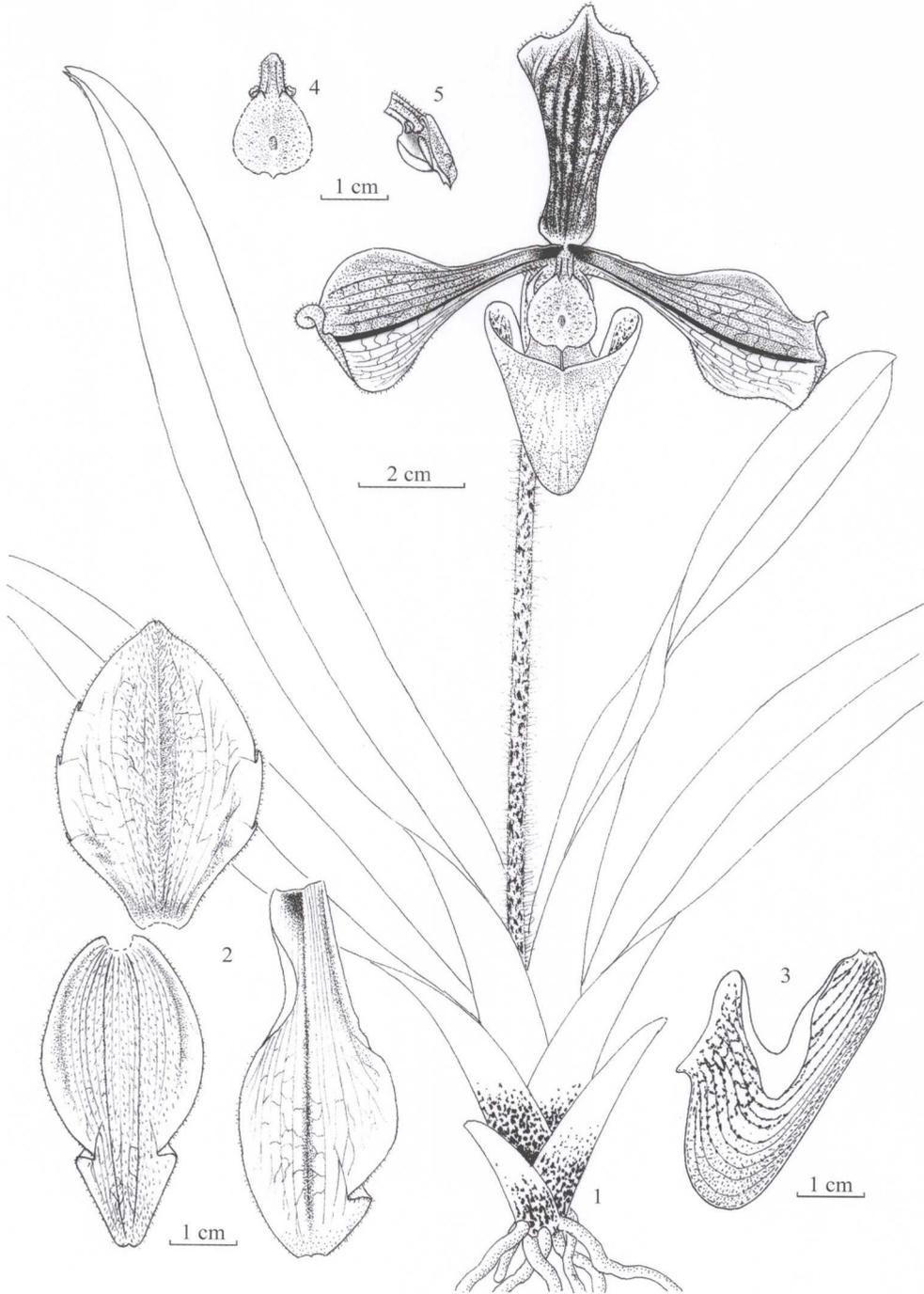


图 5-72. 包氏兜兰 (变种): 1. 带花植株; 2. 中萼片、合萼片与花瓣, 背面观; 3. 唇瓣, 纵切面; 4. 蕊柱, 正面观; 5. 蕊柱, 侧面观

Fig. 5-72. *Paphiopedilum villosum* var. *boxallii*: 1. Flowering plant; 2. Dorsal sepal, synsepal and petal, back view; 3. Lip, longitudinal section; 4. Column, front view; 5. Column, side view



图 5-73. 包氏兜兰 (变种): a. 在云南西南部野外开花; b-e. 在栽培中开花
Fig. 5-73. *Paphiopedilum villosum* var. *boxallii*: a. Flowering in the wild in Southwest Yunnan; b-e. Flowering in cultivation

20. 虎斑兜兰

Paphiopedilum tigrinum Koop. & H. Haseg. in Orch. Advocate 16 (3): 78. 1990; P. J. Cribb, Gen. Paphiopedilum (ed. 2): 261. 1998. **Type:** China, Yunnan, cult. T. Root s. n. (holotype, K!).

Paphiopedilum markianum Fowlie in Orchid Digest 54 (3): 124. 1990; Z. H. Tsi, S. C. Chen & K. Mori, Wild Orch. China: 28. 1997; S. C. Chen & Z. H. Tsi, Orch. China: 123. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 212. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China. Colour: 335. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 68. 1999. **Type:** China, Yunnan, cult. F. Mark s. n. (holotype, LA).

变种检索表

1. 中萼片与花瓣上具2—3条栗色纵带; 退化雄蕊先端稍具短尖.....
.....**20a. 虎斑兜兰 (原变种) *P. tigrinum* var. *tigrinum***
1. 中萼片与花瓣上不具栗色纵带; 退化雄蕊先端具长1—1.5 mm的短尖.....
.....**20b. 翡翠兜兰 (变种) *P. tigrinum* var. *smaragdinum***

Key to the varieties

1. Dorsal sepal and petals with 2–3 longitudinal maroon bars; staminode slightly mucronate apically.....**20a. *P. tigrinum* var. *tigrinum***
1. Dorsal sepal and petals lacking maroon bars; staminode with an apical mucro 1–1.5 mm long**20b. *P. tigrinum* var. *smaragdinum***

20a. 虎斑兜兰 (原变种) (图5-74, 75, 76) (Fig. 5-74, 75, 76)***Paphiopedilum tigrinum* var. *tigrinum***

树上附生、石上附生或地生植物。叶3—5枚, 狭矩圆形, 革质, 长13—27 cm, 宽2.1—2.8 cm, 先端浑圆或急尖并有不等的2浅裂, 上面绿色, 背面浅绿色。花萼近直立或外弯, 长18—36 cm, 绿色, 密被紫色短柔毛; 苞片椭圆状矩圆形, 长3.5—5.5 cm, 绿色, 近基部或顶端有紫色斑点或晕, 近背面基部被紫色短柔毛; 花梗和子房长3.5—5.5 cm, 绿色, 被紫色短柔毛; 花单朵, 直径9—12 cm; 中萼片浅黄绿色, 有3条不规则的栗色纵带; 合萼片浅黄绿色, 近基部有栗色条纹与斑点; 花瓣下半部浅黄绿色, 上半部浅紫色, 下部3/5长度具2条栗色纵带; 唇瓣浅绿褐色, 有浅褐色或浅紫褐色的晕; 退化雄蕊带乳白的黄色, 中心为紫褐色; 中萼片宽倒卵形或近圆

形, 长3.5—4.5 cm, 宽2.8—3.7 cm, 先端近急尖, 基部边缘外弯, 有细缘毛, 背面近先端被短柔毛; 合萼片椭圆形, 长3—4.5 cm, 宽1.9—2.5 cm, 先端钝或2浅裂, 背面被微柔毛; 花瓣匙形, 长5.5—7 cm, 宽2.3—3.5 cm, 先端钝并有不明显的3小齿, 半扭转, 边缘波状, 具细缘毛, 上面基部有紫色短柔毛; 唇瓣盔状; 囊椭圆状卵形, 长2—3 cm, 宽2—2.5 cm, 囊口两侧呈耳状; 退化雄蕊倒卵状椭圆形, 长1.2—1.4 cm, 宽8—9 mm, 先端有不明显的3小齿或稍具短尖, 上面有乳突, 中央有脐状突起。 $2n=26$ 。

花期: 野外为5—8月。

分布: 云南东南部至西部(麻栗坡县、盈江县、腾冲县和泸水县); 缅甸。

生境: 疏林中树上、覆盖苔藓的岩石上或多石之地; 海拔1200—2200 m。

说明: 在麻栗坡此种被看到生长于石灰岩地区。

Epiphytic, lithophytic or terrestrial plants. Leaves 3–5, narrowly oblong, coriaceous, 13–27 cm long, 2.1–2.8 cm wide, rounded or acute and unequally bilobulate at apex, adaxially green, abaxially pale green. Scape suberect or arching, 18–36 cm long, green, densely purple-pubescent; bract elliptic-oblong, 3.5–5.5 cm long, green spotted or flushed with purple toward the base and apex, purple-pubescent toward abaxial base; pedicel and ovary 3.5–5.5 cm long, green, purple-pubescent; flower single, 9–12 cm across; dorsal sepal pale yellow-green with three irregular longitudinal maroon bars; synsepal pale yellow-green with maroon stripes or spots toward the base; petals pale yellow-green in basal half and pale purple in apical half, with two longitudinal maroon bars in basal three fifths; lip pale yellow-green flushed with pale brown or pale purple-brown; staminode whitish-yellow, with a purple-brown center; dorsal sepal broadly obovate or suborbicular, 3.5–4.5 cm long, 2.8–3.7 cm wide, subacute at apex, basal margins recurved, minutely ciliate, puberulous abaxially and toward adaxial apex; synsepal elliptic, 3–4.5 cm long, 1.9–2.5 cm wide, obtuse or bilobulate at apex, puberulous abaxially; petals spatulate, 5.5–7 cm long, 2.3–3.5 cm wide, rounded and obtusely tridenticulate at apex, half-twisted, undulate-margined, minutely ciliate, purple-pubescent at adaxial base; lip helmet-shaped; pouch ellipsoid-ovoid, 2–3 cm long, 2–2.5 cm wide, auriculate on both sides of its mouth; staminode obovate-elliptic, 1.2–1.4 cm long, 8–9 mm wide, obscurely tridenticulate or slightly mucronate at apex, papillose adaxially, with a central umbo. $2n=26$.

Flowering period: May to August in the wild.

Distribution: SE to W Yunnan (Malipo county, Yingjiang county, Tengchong county and Lushui county); Myanmar.

Habitat: On trees or mossy rocks or in rocky places in open forests at an elevation of 1200–2200 m.

Note: In Malipo county this species was seen growing in limestone areas.

20b. 翡翠兜兰 (变种) (图5-77, 78) (Fig. 5-77, 78)

Paphiopedilum tigrinum var. **smaragdinum** (Z. J. Liu & S. C. Chen) Z. J. Liu & S. C. Chen, comb. et stat. nov. **Type:** China, Yunnan, Lushi, Z. J. Liu 2772 (holotype, NOCC!).

Paphiopedilum smaragdinum Z. J. Liu & S. C. Chen in J. Wuhan Bot. 21 (6): 489. 2003.

?*Paphiopedilum tigrinum* Koop. & Haseg. f. *huberae* Koop. in Die Orchidee 53 (4): 518. 2002.

Paphiopedilum tigrinum Koop. & Haseg. f. *smaragdinum* (Z. J. Liu & S. C. Chen) Gruss in Die Orchidee (Hamburg) 56 (1): 71. 2005.

该变种与虎斑兜兰 (原变种) (*P. tigrinum* var. *tigrinum*) 的区别在于它的花黄绿色, 中萼片与花瓣上无栗色纵带; 退化雄蕊先端具长1—1.5 mm的短尖。

花期: 野外为6—7月。

分布: 云南西部 (泸水县)。

生境: 林下荫蔽、湿润之地; 海拔约2500 m。

This variety differs from the typical variety (*P. tigrinum* var. *tigrinum*) by its pale yellow-green flower lacking longitudinal maroon bars on dorsal sepal and petals, and staminode with an apical mucro 1–1.5 mm long.

Flowering period: June and July in the wild.

Distribution: W Yunnan (Lushui county).

Habitat: Shaded and moist places in forests, at an elevation of nearly 2500 m.

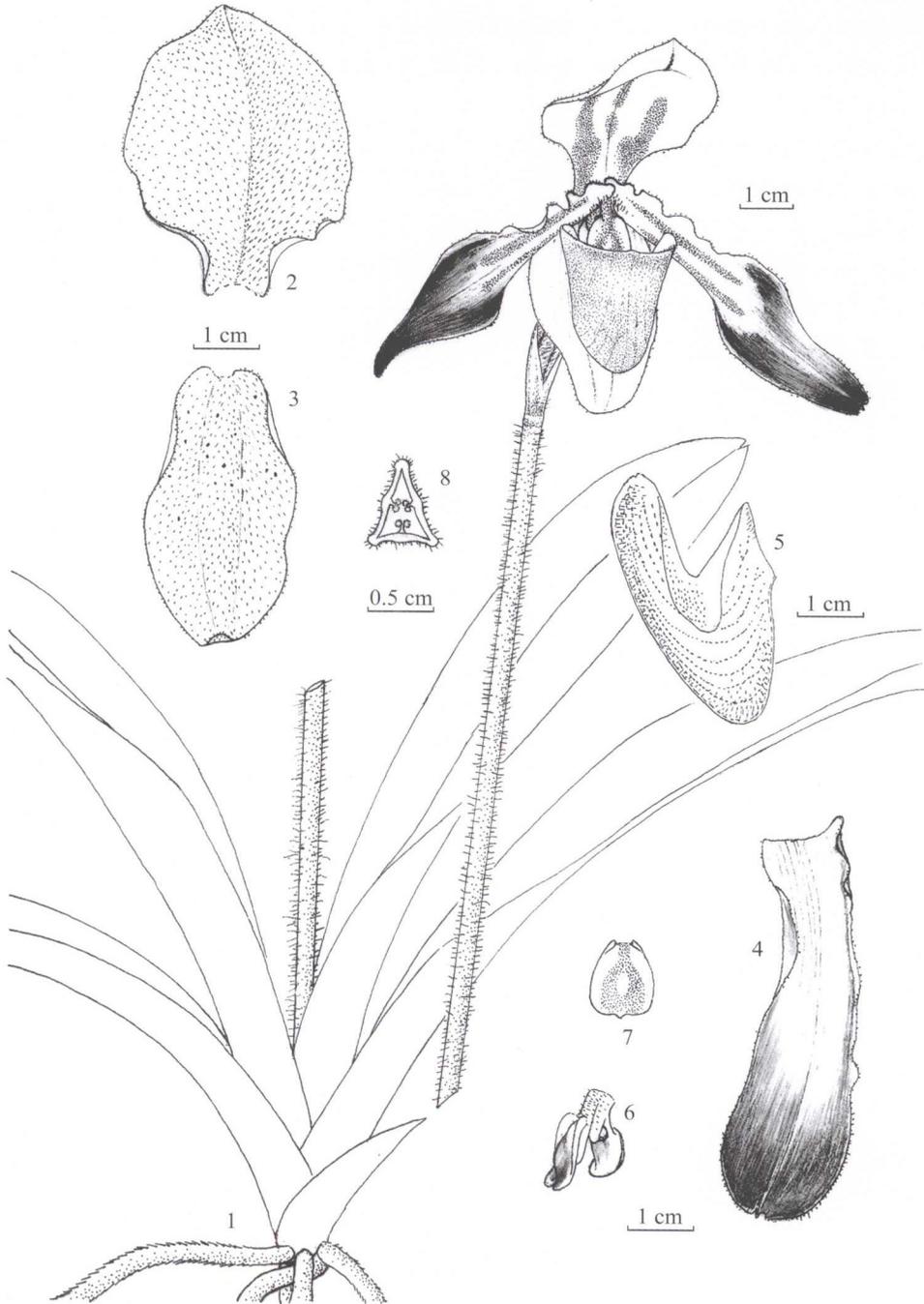


图 5-74. 虎斑兜兰 (原变种); 1. 带花植株; 2. 中萼片, 背面观; 3. 合萼片, 背面观; 4. 花瓣, 背面观; 5. 唇瓣, 纵切面; 6. 蕊柱; 7. 退化雄蕊; 8. 子房横切面

Fig. 5-74. *Paphiopedilum tigrinum* var. *tigrinum*: 1. Flowering plant; 2. Dorsal sepal, back view; 3. Synsepal, back view; 4. Petal, back view; 5. Lip, longitudinal section; 6. Column; 7. Staminode; 8. Ovary cross section



图 5-75. 虎斑兜兰（原变种）：a. 在云南西部的自然生境；b. 在云南西部野外开花
Fig. 5-75. *Paphiopedilum tigrinum* var. *tigrinum*: a. Its natural habitat in western Yunnan; b. Flowering in the wild in western Yunnan

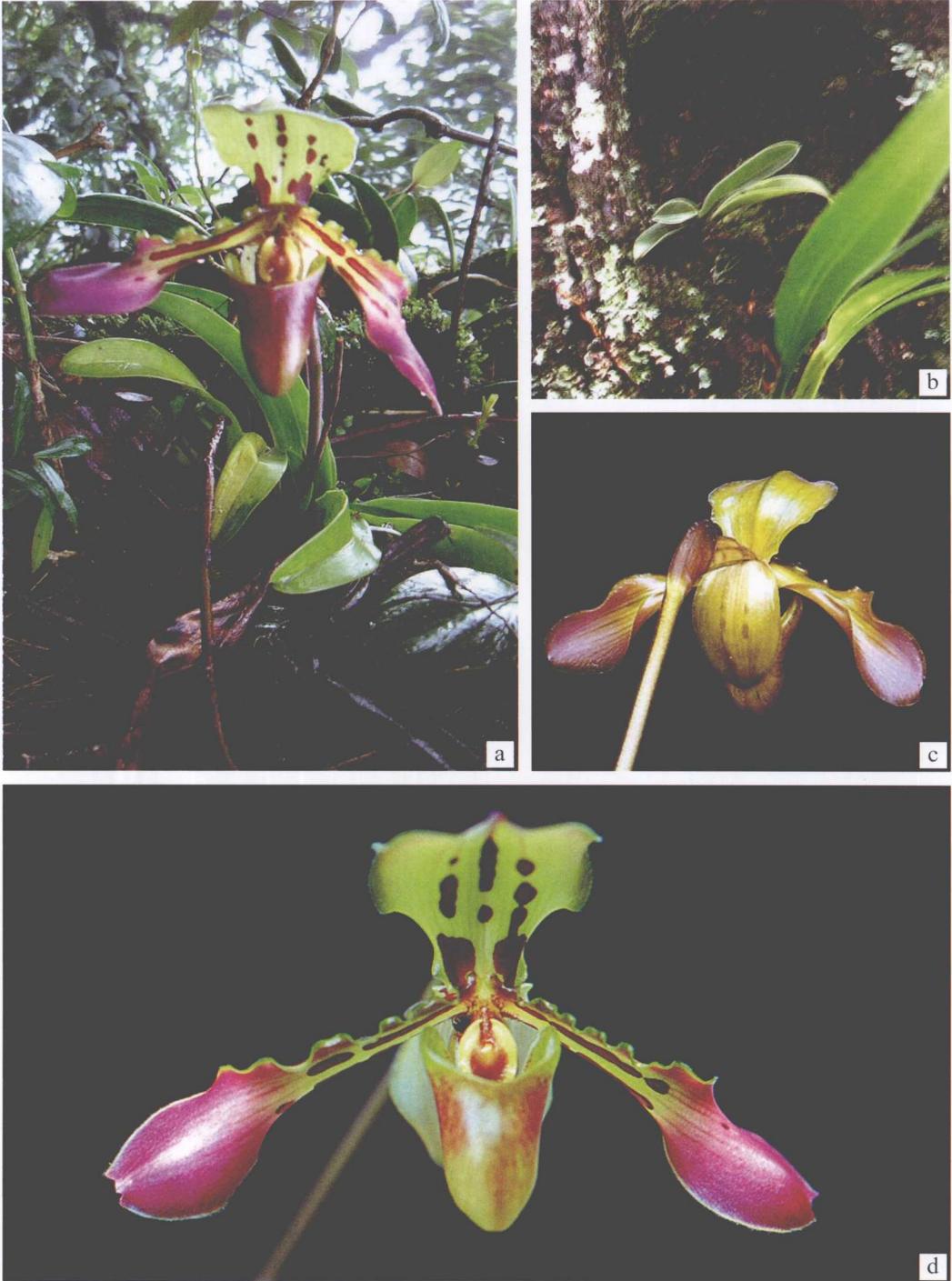


图 5-76. 虎斑兜兰（原变种）： a. 云南西部野外开花； b. 生于云南西部疏林中树干上； c, d. 在栽培中开花

Fig. 5-76. *Paphiopedilum tigrinum* var. *tigrinum*: a. Flowering in the wild in western Yunnan; b. Growing on tree trunk in open forest in western Yunnan; c, d. Flowering in cultivation

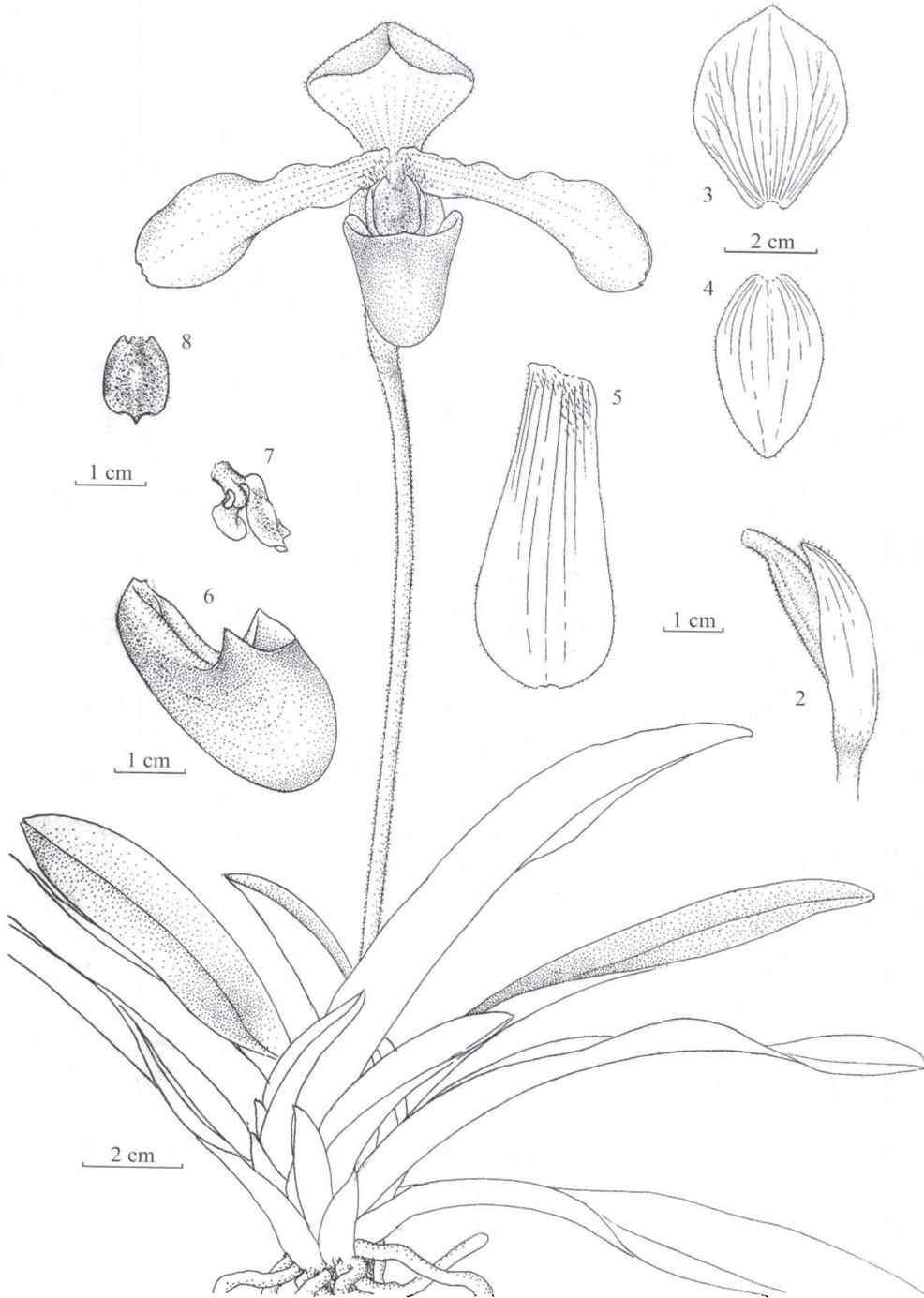


图 5-77. 翡翠兜兰 (变种): 1. 带花植株; 2. 苞片和子房; 3. 中萼片; 4. 合萼片; 5. 花瓣; 6. 唇瓣; 7. 蕊柱; 8. 退化雄蕊

Fig. 5-77. *Paphiopedilum tigrinum* var. *smaragdinum*: 1. Flowering plant; 2. Bract and ovary; 3. Dorsal sepal; 4. Synsepal; 5. Petal; 6. Lip; 7. Column; 8. Staminode



图 5-78. 翡翠兜兰 (变种): 在栽培中开花

Fig. 5-78. *Paphiopedilum tigrinum* var. *smaragdinum*: Flowering in cultivation

21. 白旗兜兰 (图5-79, 80, 81) (Fig. 5-79, 80, 81)

Paphiopedilum spicerianum (Rchb. f.) Pfitzer in Pringsheim, Jahrb. Wiss. Bot. 19: 164. 1888; P. J. Cribb, Gen. Paphiopedilum: 155. 1987, et Gen. Paphiopedilum (ed. 2): 269. 1998; Braem, Paphiopedilum: 132. 1988; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 268. 1999; D. P. Ye & Y. B. Luo in Acta Phytotax. Sin. 44 (4): 471. 2006. **Type:** India, Assam, cult. Veitch ex Spicer (holotype, W).

Cypripedium spicerianum Rchb. f. in Gard. Chron. n. s., 13: 41. 363. 1880.

Cordula spiceriana (Rchb. f.) Rolfe in Orchid Rev. 20: 2. 1912.

地生或石上附生植物。叶3—5枚，革质，带形至狭矩圆状椭圆形，通常长14—30 cm，宽1.8—2.5（—6）cm，先端急尖或略2浅裂，上面暗绿色，背面浅绿色并在近基部处具紫色斑点，沿基部边缘稍波状。花葶近直立，长12—22（—30）cm，紫色，上部疏被短柔毛；苞片椭圆形，长1.7—2.9 cm，浅绿黄色，背面具栗色中脉；花梗和子房长2.5—4.3 cm，浅紫色至浅褐色，无毛；花单朵或极罕2朵，直径5—7（—8）cm；中萼片白色，具栗色中脉和浅绿色基部；合萼片浅黄绿色或白绿色；花瓣浅黄绿色，具褐紫色中脉，沿侧脉有许多浅色细斑点；唇瓣浅绿褐色或浅黄褐色，具暗色脉；退化雄蕊白色，中央有紫色斑块；中萼片宽卵状圆形至横椭圆形，向前俯倾，长2.8—4.9 cm，宽3.2—4.1 cm，先端钝或浑圆，基部边缘外弯，边缘具细缘毛，两面被微柔毛；合萼片卵状椭圆形，长2.5—4 cm，宽1.4—2.8 cm，先端钝，两面被微柔毛或上表面变无毛；花瓣狭匙形或狭矩圆形，长2.6—5.2 cm，宽6—18 mm，先端浑圆或钝，边缘波状，上面基部被白色长柔毛；唇瓣盔状；囊卵形，长2—3.2 cm，宽1.8—2.8 cm，囊口两侧呈耳状；退化雄蕊倒卵形或近倒卵状圆形，长约1 cm，宽6—7 mm，先端钝，基部边缘上卷，貌似一对眼睛。 $2n=28, 30$ 。

花期：野外为9—11月。

分布：云南南部至西南部（普洱市、西盟县和盈江县）；印度东北部、缅甸。

生境：林下多石之地或岩石上；海拔900—1400 m。

说明：该种与秀丽兜兰（*P. venustum*）之间的天然杂种：白秀兜兰（杂种）（*Paphiopedilum* × *spicerovenustum* Pradhan）（in Indian Orchids: Guide Identif. & Cult. 2: 676. 1979）发现于印度。此外，该种之下有一个白化型，即无点变型（f. *immaculatum* Braem）（1999），产于印度。

Terrestrial or lithophytic plants. Leaves 3–5, coriaceous, lorate to narrowly oblong-elliptic, usually 14–30 cm long, 1.8–2.5(–6) cm wide, acute and slightly bilobulate at apex, adaxially dark green, abaxially pale green and spotted with purple toward the base, slightly undulate along basal margins. Scape suberect, 12–22(–30) cm long, purple, sparsely pubescent above; bract elliptic, 1.7–2.9 cm long, pale green-yellow, with a maroon midvein abaxially; pedicel and ovary 2.5–4.3 cm long, pale purple to pale brown, glabrous; flowers single or very rarely 2, 5–7(–8) cm across; dorsal sepal white with a maroon midvein and pale green base; synsepal pale yellow-green or whitish-green; petals pale yellow-green

with a brown-purple midvein and many small paler spots along lateral veins; lip pale green-brown or pale yellow-brown with darker veins; staminode white, with a purple blotch centrally; dorsal sepal broadly ovate-orbicular to transversely elliptic, curving forward, 2.8–4.9 cm long, 3.2–4.1 cm wide, obtuse to rounded at apex, basal margins recurved, minutely ciliate, puberulous on both surfaces; synsepal ovate-elliptic, 2.5–4 cm long, 1.4–2.8 cm wide, obtuse at apex, puberulous on both surfaces or glabrescent adaxially; petals linear-spatulate or narrowly oblong, 2.6–5.2 cm long, 6–18 mm wide, rounded or obtuse at apex, undulate-margined, white-villose at adaxial base; lip helmet-shaped; pouch ovoid, 2–3.2 cm long, 1.8–2.8 cm wide, auriculate on both sides of its mouth; staminode obovate or obovate-suborbicular, ca. 1 cm long, 6–7 mm wide, obtuse at apex, basal margins involute and looking like a pair of eyes. $2n=28, 30$.

Flowering period: September to November in the wild.

Distribution: S to SW Yunnan (Puer city, Ximen county and Yingjiang county); NE India, Myanmar.

Habitat: In shaded and moist places on soil-covered cliffs or on rocks in forests at an elevation between 900 and 1400 m.

Note: A natural hybrid between this species and *P. venustum*, *P. × spicerovenustum* Pradhan (in *Indian Orchids: Guide Identif. & Cult.* 2: 676. 1979), was described from India. Besides, an albino form of this species, f. *immaculatum* Braem, was also found in India in 1999.

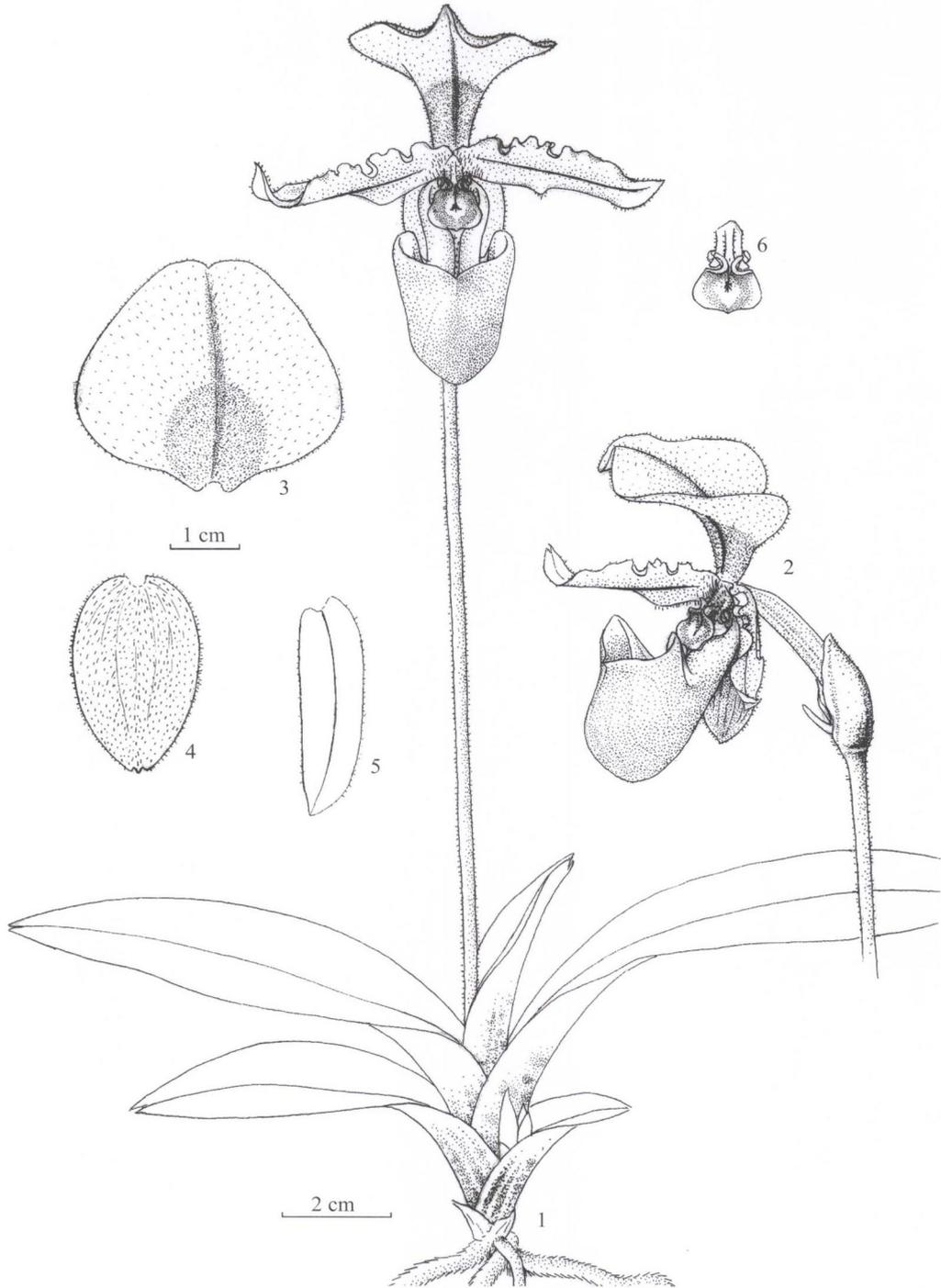


图 5-79. 白旗兜兰: 1. 带花植株; 2. 花, 侧面观; 3. 中萼片, 背面观; 4. 合萼片, 背面观; 5. 花瓣, 背面观; 6. 蕊柱, 正面观

Fig. 5-79. *Paphiopedilum spicerianum*: 1. Flowering plant; 2. Flower, side view; 3. Dorsal sepal, back view; 4. Synsepal, back view; 5. Petal, back view; 6. Column, front view



图 5-80. 白旗兜兰: a, b. 在云南西南部的自然生境中开花

Fig. 5-80. *Paphiopedilum spicerianum*: a, b. Flowering in its natural habitat in Southwest Yunnan



图 5-81. 白旗兜兰: a-c. 在栽培中开花

Fig. 5-81. *Paphiopedilum spicerianum*: a-c. Flowering in cultivation

22. 卷萼兜兰 (图5-82, 83, 84; 图版15) (Fig. 5-82, 83, 84; Pl. 15)

Paphiopedilum appletonianum (Gower) Rolfe in Orchid Rev. 4: 364. 1896; Pfitzer in Engler, Pflanzenreich IV(50) Heft 12: 79. 1903; T. Tang & S. C. Chen in Anonymous, Fl. Hainan 4: 190. 1977; Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 46. 1982; P. J. Cribb, Gen. Paphiopedilum: 161. 1987, et Gen. Paphiopedilum (ed. 2): 280. 1998; Braem, Paphiopedilum: 149. 1988; S. C. Chen & Z. H. Tsi, Orch. China: 118. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 292. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 321. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 68. 1999; Aver. et al., Slipper Orch. Vietnam: 218. 2003. **Type:** hort. F. Appleton, April 1893 (holotype, K!).

Cypripedium appletonianum Gower in The Garden 1: 95. 1893.

Cypripedium bullenianum Rchb.f. var. *appletonianum* (Gower) Rolfe in Orchid Rev. 1: 135. 1893.

Cypripedium poyntzianum O'Brien in Gard. Chron. ser. 3, 15: 36. 1894. **Type:** hort. R. Young, Jan. 1895 (lectotype, K!).

Cypripedium wolterianum Kraenzl. in Gard. Chron. ser. 3, 17: 166. 1895. **Type:** hort. D. Wolter (holotype, B†).

Paphiopedilum wolterianum (Kraenzl.) Pfitzer in Englers Pflanzenreich IV(50) Heft 12: 79. 1903.

Paphiopedilum appletonianum (Gower) Rolfe var. *poyntzianum* (O'Brien) Pfitzer in Engler, Pflanzenreich IV(50) Heft 12: 79. 1903.

Cordula appletoniana (Gower) Rolfe in Orchid Rev. 20: 2. 1912.

Paphiopedilum hookerae (Rchb. f. ex Hook. f.) Stein subsp. *appletonianum* (Gower) M. W. Wood in Orchid Rev. 85, 1007: 11. 1977.

Paphiopedilum hainanense Fowlie in Orchid Digest 51(2): 69. 1987, 'hainanensis'. **Type:** China, Hainan, cult. Los Angeles Arb. CC87FR28 (holotype, UCLA).

Paphiopedilum appletonianum var. *hainanense* (Fowlie) Braem, C. Baker & M. Baker, Gen. *Paphiopedilum* Nat. Hist. Cult. 2: 295. 1999.

地生或石上附生植物。叶4—8枚, 狭椭圆形或矩圆状椭圆形, 长9—20 (—25) cm, 宽2—4 cm, 先端急尖并具2浅裂或3小齿, 上面具明显的或偶见模糊的深浅绿色相间的网格斑, 背面浅绿色并常在近基部处有紫色斑。花葶直立, 长17—60 cm, 紫色, 被白色短柔毛; 苞片卵状披针形, 长1.5—2.3 cm, 绿色, 先端渐尖, 边缘具缘毛; 花梗和子房长4—7 cm, 被短柔毛; 花单朵, 罕有2朵, 直径6—8 (—10) cm; 中萼片与合萼片浅绿色或白绿色, 具绿色纵脉, 有时基部有褐紫色晕; 花瓣基部浅绿色, 向顶端变为玫瑰红色或暗粉红色, 下半部散生有暗褐色斑点或有时有绿褐色条纹; 唇瓣橄榄绿、玫瑰红或浅紫色, 边缘浅绿黄色; 退化雄蕊浅黄绿色, 中央绿色; 中萼片卵形或宽卵形, 长3.5—4 cm, 宽2—3 cm, 先端急尖, 边缘具细缘毛; 合萼片椭

圆状披针形，长2—3 cm，宽1—1.5 cm，先端渐尖，边缘具细缘毛；花瓣匙形，长4—6 cm，宽1.3—2 cm，上半部常半扭转，下半部沿上侧边缘具黑褐色疣点，有时下侧边缘也有疣点，但较少；唇瓣盔状；囊近椭圆形，长2—3 cm，宽1.5—2 (—2.5) cm，前端边缘中央具1个深缺口，缺口两侧各有1—3齿；退化雄蕊倒心形至月牙形，长6—8 mm，宽8—10 mm，先端具2—5齿；两侧的齿较长，常为镰刀状。 $2n=38$ 。

花期：野外为1—5月。

分布：广西西南部、海南、云南东南部；柬埔寨、老挝、泰国、越南。

生境：生于林下或灌木林中多石和腐殖质丰富之地或岩石缝隙中；海拔300—1200 m。

说明：克列兜兰（杂种）（*Paphiopedilum* × *cribbii*）[in *Orchids* (West Palm Beach) 75 (6): 458. 2006]发现于越南，被认为是该种与紫毛兜兰（*P. villosum*）之间的天然杂种。该种之下有两个变型：无点变型[f. *immaculatum* (Braem) Braem]（1998）与白花变型（f. *album* Asher ex Gruss）（2000）。

Paphiopedilum × *affine* De Willd. (in *Tribune Hort.* 1: 57. 1906) 曾一度被认为是该种与紫毛兜兰（*P. villosum*）之间的杂种（Cribb, 1998），但L. V. Averyanov（2006）将它归入格力兜兰（*P. gratixianum*）或视为格力兜兰与具斑叶种类（如卷萼兜兰）之间的杂种。

Terrestrial or lithophytic plants. Leaves 4–8, narrowly elliptic or oblong-elliptic, 9–20 (–25) cm long, 2–4 cm wide, bilobulate or tridenticulate at acute apex, distinctly or rarely obscurely tessellated with dark and light green adaxially, pale green and often purple-marked toward the base abaxially. Scape erect, 17–60 cm long, purple, white-pubescent; bract ovate-lanceolate, 1.5–2.3 cm long, green, acuminate at apex, ciliate; pedicel and ovary 4–7 cm long, pubescent; flowers single or rarely 2, 6–8 (–10) cm across; dorsal sepal and synsepal pale green or whitish-green, longitudinally green-veined, sometimes flushed with brown-purple basally; petals pale green basally, turning to rose-red or dull pink toward the apex, scatteredly with dark brown spots or sometimes green-brown stripes in basal half; lip olive-green, rose-red or pale purple, with a green or pale green-yellow margin; staminode pale yellow-green with a green center; dorsal sepal ovate or broadly ovate, 3.5–4 cm long, 2–3 cm wide, acute at apex, minutely ciliate; synsepal elliptic-lanceolate, 2–3 cm long, 1–1.5 cm wide, acuminate at apex, minutely ciliate; petals spatulate, 4–6 cm long, 1.3–2 cm wide, often half-twisted in apical half, with blackish-brown warts along upper margin and sometimes also, but fewer, along lower margin in basal half; lip helmet-shaped; pouch subellipsoid, 2–3 cm long, 1.5–2 (–2.5) cm wide, its front margin with a deep incisure centrally and 1–3 teeth on both sides of it; staminode broadly obcordate to lunate, 6–8 mm long, 8–10 mm wide, with 2–5 teeth at apex; lateral teeth longer, often falcate. $2n=38$.

Flowering period: January to May in the wild.

Distribution: SW Guangxi, Hainan, SE Yunnan; Cambodia, Laos, Thailand, Vietnam.

Habitat: In rocky and humus-rich places or crevices of rocks in forests or thickets at an elevation between 300 and 1200 m.

Note: *Paphiopedilum* × *cribbii* Aver. [in *Orchids* (West Palm Beach) 75(6): 458. 2006] described from southern Vietnam was considered to be a natural hybrid between this species and *P. villosum*. Besides, two forms of this species have been recognized: f. *immaculatum* (Braem) Braem (1998) and f. *album* Asher ex Gruss (2000).

Paphiopedilum × *affine* De Willd. (in *Tribune Hort.* 1: 57. 1906) was once regarded as a hybrid of this species and *P. villosum* (Cribb, 1998), but recently considered by L. V. Averyanov (2006) to be a derivative of *P. gratixianum* or hybrid of it and a species with mottled leaves such as *P. appletonianum*.

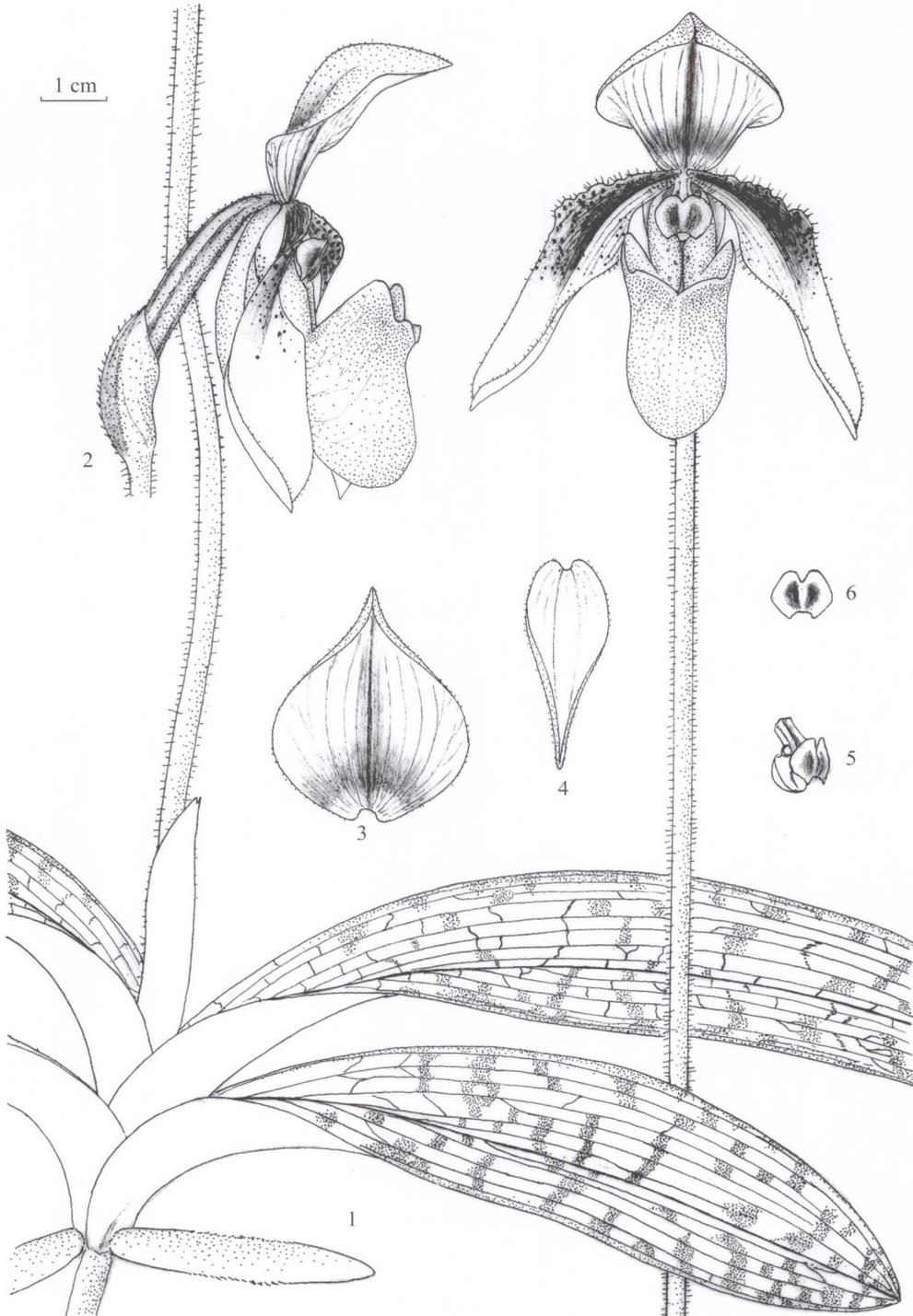


图 5-82. 卷萼兜兰: 1. 带花植株; 2. 花, 侧面观; 3. 中萼片; 4. 合萼片; 5. 蕊柱; 6. 退化雄蕊
 Fig. 5-82. *Paphiopedilum appletonianum*: 1. Flowering plant; 2. Flower, side view; 3. Dorsal sepal; 4. Synsepal; 5. Column; 6. Staminode



图 5-83. 卷萼兜兰: a. 在海南西南部的自然生境; b. 在海南西南部野外开花
Fig. 5-83. *Paphiopedilum appletonianum*: a. Its natural habitat in Southwest Hainan; b. Flowering in the wild in Southwest Hainan



图 5-84. 卷萼兜兰: a, b. 在广西西南部野外开花; c, d. 在栽培中开花
Fig. 5-84. *Paphiopedilum appletonianum*: a, b. Growing in its natural habitat in Southwest Guangxi; c, d. Flowering in cultivation



图版 15. 卷萼兜兰
Plate 15. *Paphiopedilum appletonianum*

水彩画 作者: 吴俊强
Water color painting by Jun-qiang Wu

23. 紫纹兜兰 (图5-85, 86, 87; 图版16) (Fig. 5-85, 86, 87; Pl. 16)

Paphiopedilum purpuratum (Lindl.) Stein, Orchideenbuch: 481: 1892, Pfitzer in Bot. Jahrb. Syst. 19: 40. 1894, et in Engler, Pflanzenreich IV(50) Heft 12: 86. 1903; Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 54. 1982; P. J. Cribb, Gen. Paphiopedilum: 205. 1987, et Gen. Paphiopedilum (ed. 2): 380. 1998; Braem, Paphiopedilum: 179. 1988; S. C. Chen & Z. H. Tsi, Orch. China: 124. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 336. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 338. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 69. 1999; Aver. et al., Slipper Orch. Vietnam: 236. 2003. **Lectotype:** cult. Loddiges, illustration in Bot. Reg. 23: t. 1991. 1837 (selected by P. J. Cribb, 1998).

Cypripedium purpuratum Lindl. in Bot. Reg. 23: t. 1991. 1837; Hook. in Curtis's Bot. Mag. 82: t. 4901. 1856.

Cypripedium sinicum Hance ex Rchb. f. in Walp. Ann. 3: 602. 1853. **Type:** Hongkong, Hance s. n. (holotype, W).

Paphiopedilum sinicum (Hance ex Rchb. f.) Stein, Orchideenbuch: 481. 1892.

Cordula purpurata (Lindl.) Rolfe in Orchid Rev. 20: 2. 1912.

Paphiopedilum purpuratum var. *hainanense* F. Y. Liu & Perner in Die Orchidee 52 (1): 64. 2001. **Type:** China, Hainan, M. E. Tang 98003 (holotype, KUN!).

Paphiopedilum aestivum Z. J. Liu & J. Yong Zhang in Acta Phytotax. Sin. 39 (6): 568. 2001. **Type:** China, Yunnan, Wenshan, cult., Z. J. Liu 1525 (holotype, NOCC!).

地生植物。叶4—6(—8)枚, 狭椭圆形或矩圆状椭圆形, 长9—17 cm, 宽2.5—4 cm, 先端急尖并稍具3小齿, 上面明显或模糊地具深浅绿色相间的网格斑, 背面绿色。花葶直立或近直立, 长14—22 cm, 紫色, 被白色短柔毛; 苞片狭卵状椭圆形, 长1.5—2.4 cm, 宽7—9 mm, 具缘毛; 花梗和子房长3—4.5 cm, 被短柔毛; 花单朵, 直径8—10 cm; 中萼片白色, 具紫栗色粗脉, 有时近基部为浅绿色; 合萼片白色, 具绿色脉; 花瓣紫栗色, 有暗紫色脉, 近基部和顶端有浅绿色或浅黄色晕, 从基部到1/3处具紫栗色斑点; 唇瓣紫栗色; 退化雄蕊浅黄绿色, 稍有紫色晕, 具暗色脉; 中萼片宽卵形, 长3—4 cm, 宽3—4.2 cm, 先端渐尖, 边缘具细缘毛, 背面被微柔毛; 合萼片卵形或卵状披针形, 长2—3.5 cm, 宽0.9—1.6 cm, 先端渐尖, 边缘具细缘毛, 背面被微柔毛; 花瓣近矩圆形, 长3.5—5 cm, 宽1—1.4 cm, 先端急尖, 具近黑色缘毛, 有时上面的黑栗色斑点变为疣状; 唇瓣盔状, 其内弯的侧裂片上具许多疣状突起; 囊卵形, 长2—3 cm, 宽2.2—2.8 cm, 囊口两侧呈耳状; 退化雄蕊月牙形, 长7—8 mm, 宽10—11 mm, 先端具2个内弯的侧裂片和1个中央的齿, 上面被微柔毛。2n=40。

花期: 野外为6—9月(广西和云南)和10月至翌年1月(广东、海南和香港)。

分布: 福建南部、广东南部、广西南部、海南、香港、云南东南部; 越南北部。

生境: 在福建、广东、海南和香港, 生于次生阔叶林或灌木林下的多石土壤

上，海拔100—1200 m；在广西和云南生于石灰岩地区林下或灌木林下多石或腐殖质丰富之地，海拔1200—1500 m。

说明：在福建、广东、海南和香港，此种植物见于次生林下的酸性土壤上，花期从10月至翌年1月，而广西和云南植物则见于石灰岩地区，花期从6月至9月。基于后者，夏花兜兰（*P. aestivum*）被作为新种描述。然而，不论在花的形态或叶的性状，似乎很难将它们区别开来。这里被作为同种处理，但有必要做进一步的研究。

Terrestrial plants. Leaves 4–6 (–8), narrowly elliptic or oblong-elliptic, 9–17 cm long, 2.5–4 cm wide, acute and slightly tridenticulate at apex, distinctly or obscurely tessellated with dark and light green adaxially, pale green abaxially. Scape erect or suberect, 14–22 cm long, purple, white-pubescent; bract narrowly ovate-elliptic, 1.5–2.4 cm long, 7–9 mm wide, ciliate; pedicel and ovary 3–4.5 cm long, pubescent; flower single, 8–10 cm across; dorsal sepal white, boldly veined with purple-maroon, sometimes pale green toward its base; synsepal white, with green veins; petals purple-maroon veined with dark purple, tinged with pale green or pale yellow toward the base and apex, and spotted with blackish-maroon in basal one third; lip purple-maroon; staminode pale yellow-green, slightly flushed purple, with darker veins; dorsal sepal broadly ovate, 3–4 cm long, 3–4.2 cm wide, acuminate at apex, minutely ciliate, puberulous abaxially; synsepal ovate to ovate-lanceolate, 2–3.5 cm long, 0.9–1.6 cm wide, acuminate at apex, minutely ciliate, puberulous abaxially; petals suboblong, 3.5–5 cm long, 1–1.4 cm wide, acute at apex, blackish-ciliate, sometimes the blackish-maroon spots becoming wart-like; lip helmet-shaped, warty on its incurved side-lobes; pouch ovoid, 2–3 cm long, 2.2–2.8 cm wide, auriculate on both sides of its mouth; staminode lunate, 7–8 mm long, 10–11 mm wide, with two incurved side-lobes and a center tooth at apex, puberulous adaxially. $2n=40$.

Flowering period: June to September (Guangxi and Yunnan) and October to January (Guangdong, Hainan and Hongkong) in the wild.

Distribution: S Fujian, S Guangdong, S Guangxi, Hainan, Hongkong, SE Yunnan; N Vietnam.

Habitat: In rocky soil in secondary broad-leaved forests or thickets at an altitude between 100–1200 m (Fujian, Guangdong, Hainan and Hongkong); or in rocky and humus-rich places in forests or thickets in limestone areas at an altitude between 1200 and 1500 m (Guangxi and Yunnan).

Note: The plants of Fujian, Guangdong, Hainan and Hongkong are mostly found in acidic soil in secondary forests, flowering from October to January, while those of Guangxi and Yunnan are in limestone areas, flowering from June to September. Base on the latter plants *Paphiopedilum aestivum* was described. But it seems difficult to distinguish them from each other by either floral morphology or leaf features. They are treated here as conspecific, but a further investigation is needed.

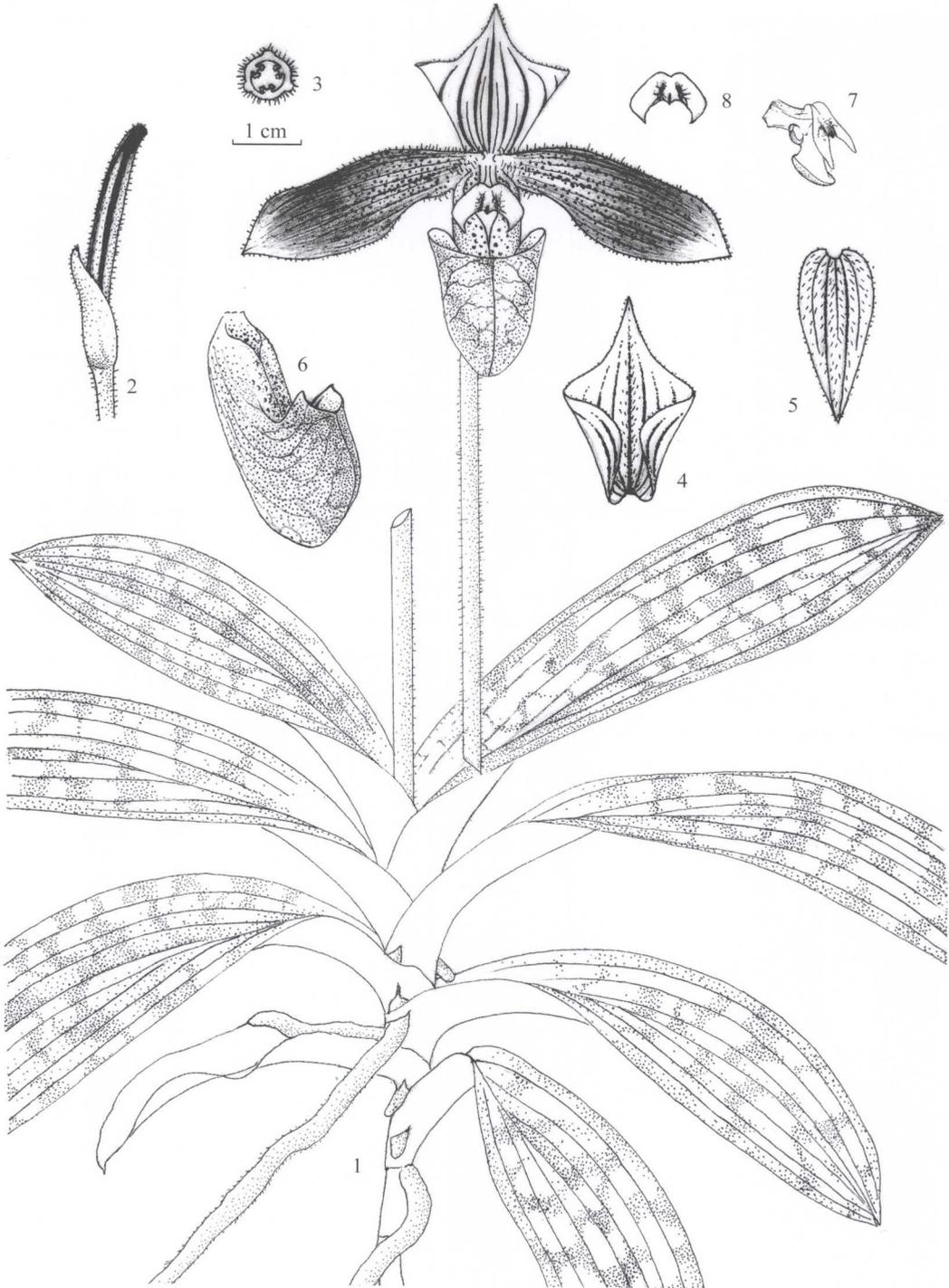


图 5-85. 紫纹兜兰: 1. 带花植株; 2. 苞片和子房; 3. 子房横切面; 4. 中萼片, 背面观; 5. 合萼片, 背面观; 6. 唇瓣; 7. 蕊柱; 8. 退化雄蕊

Fig. 5-85. *Paphiopedilum purpuratum*: 1. Flowering plant; 2. Bract and ovary; 3. Ovary cross section; 4. Dorsal sepal, back view; 5. Synsepal, back view; 6. Lip; 7. Column; 8. Staminode



图 5-86. 紫纹兜兰: a. 在广东南部的自然生境; b. 在广东南部野外开花

Fig. 5-86. *Paphiopedilum purpuratum*: a. Its natural habitat in southern Guangdong; b. Flowering in the wild in southern Guangdong



图 5-87. 紫纹兜兰: a-d. 生于广东南部的自然生境中; e, f. 在栽培中开花
Fig. 5-87. *Paphiopedilum purpuratum*: a-d. Growing in its natural habitat in southern Guangdong;
e, f. Flowering in cultivation



图版 16. 紫纹兜兰
Plate 16. *Paphiopedilum purpuratum*

油画 作者: 李丝云
Oil painting by Si -yun Li

24. 彩云兜兰 (图5-88, 89, 90; 图版17) (Fig. 5-88, 89, 90; Pl. 17)

Paphiopedilum wardii Summerh. In Gard. Chron. ser. 3, 92: 446. 1932, et in Curtis's Bot. Mag. 160: t. 9481. 1937; Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 60. 1982; P. J. Cribb, Gen. Paphiopedilum: 209. 1987, et Gen. Paphiopedilum (ed. 2): 388. 1998; Braem, Paphiopedilum: 185. 1988; Z. H. Tsi, S. C. Chen & K. Mori, Wild Orch. China: 19. 1997; S. C. Chen & Z. H. Tsi, Orch. China: 126. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 344. 1999; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 340. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 70. 1999. **Type:** N. Myanmar, Kingdon Ward, cult. R. B. G. Kew (holotype, K!).

Cypripedium wardii (Summerh.) Curtis in Orchid Rev. 41: 2, fig. p. 9. 1933, & 43: 30. 1935, non Rolfe.

Cypripedium wardianum E. W. Cooper in Roy. Hort. Soc. Dict. Gard. 2: 621. 1951. **Type:** Myanmar, Kingdom ward 20637 ? (BM).

Paphiopedilum microchilum Z. J. Liu & S. C. Chen in Acta Phytotax. Sin. 39 (2): 156. 2001. **Type:** China, Yunnan, Wenshan?, cult. Z. J. Liu 21021 (holotype, NOCC!).

Paphiopedilum burmanicum J. Yong Zhang & Z. J. Liu in Acta Phytotax. Sin. 39 (6): 564. 2001. **Type:** Myanmar, cult. Z. J. Liu 21022 (holotype, NOCC!).

Paphiopedilum brevilabium Z. J. Liu & J. Yong Zhang in Acta Phytotax. Sin. 39 (6): 565. 2001. **Type:** China, Yunnan, cult., Z. J. Liu 21023 (holotype, NOCC!).

Paphiopedilum multifolium Z. J. Liu & J. Yong Zhang in Acta Bot. Yunnan. 24 (2): 191. 2002. **Type:** China, Yunnan, cult., Z. J. Liu 21322 (holotype, NOCC!).

地生植物。叶3—6(—10)枚, 矩圆形或矩圆状披针形, 长10—17(—23) cm, 宽2.5—4.7 cm, 先端急尖并略呈2浅裂或具3小齿, 上面有深浅蓝绿相间的网格斑, 背面有较密集的紫斑, 近基部边缘疏生缘毛。花葶直立, 长15—35(—45) cm, 紫红色, 被短柔毛; 苞片卵状披针形, 长1.8—3 cm, 绿色并有紫色晕; 花梗和子房长4—5.5 cm, 绿色或浅紫色, 被短柔毛; 花单朵, 直径7—10 cm; 中萼片与合萼片白色或白绿色, 具深绿色纵脉; 花瓣绿白色, 多少有浅紫褐色晕, 具浓密的黑褐色斑点; 唇瓣浅绿色至浅黄褐色, 有褐色脉和细斑点; 退化雄蕊浅绿色, 中央有深绿色脉纹; 中萼片卵形, 长4—6 cm, 宽2.8—4.2 cm, 先端渐尖, 边缘具缘毛, 背面被微柔毛; 合萼片卵状披针形或披针形, 长4—5 cm, 宽2.5—3 cm, 先端急尖或渐尖, 边缘具缘毛; 花瓣平展或稍下垂, 近矩圆形或矩圆状披针形, 长5—6 cm, 宽1.5—2 cm, 先端短渐尖, 边缘具长缘毛; 唇瓣盔状, 其内弯的侧裂片上具疣状突起; 囊椭圆状卵形, 长2—3 cm, 宽2—2.4 cm, 外表面稍被微柔毛; 退化雄蕊倒心状月牙形, 长9—10 mm, 宽13—15 mm, 先端具1个中央的齿和2个内弯的侧面齿, 上面被微柔毛。 $2n=41, 44$ (?)。

花期: 野外为12月至翌年3月。

分布：云南西部（泸水县和保山市西北部）；缅甸北部。

生境：生于沿山谷生有树木的山坡或林缘杂草灌木丛生之地；海拔1200—2500 m。

说明：近来发表的盈江兜兰（杂种）（*Paphiopedilum* × *yingjiangense* Z. J. Liu & S. C. Chen）[云南植物研究29 (3): 289. 2007]系采自云南西南部的盈江县，被认为是该种与紫毛兜兰（*P. villosum*）之间的天然杂种。此外，该种之下曾记载一个白化型，即白绿变型[f. *alboviride* (Gruss & Roeth) Braem]（1998）。

Terrestrial plants. Leaves 3–6 (–10), oblong or oblong-lanceolate, 10–17 (–23) cm long, 2.5–4.7 cm wide, slightly bilobulate or tridenticulate at acute apex, adaxially tessellated with light and dark bluish-green, abaxially rather densely mottled with purple, sparsely ciliate toward basal margins. Scape erect, 15–35 (–45) cm long, purple-red, pubescent; bract ovate-lanceolate, 1.8–3 cm long, green flushed with purple; pedicel and ovary 4–5.5 cm long, green or pale purple, pubescent; flower single, 7–10 cm across; dorsal sepal and synsepal white or white-green, longitudinally veined with deep green; petals greenish-white more or less flushed with pale purple-brown and heavily spotted with blackish-brown; lip pale green to pale yellow-brown, veined and finely spotted with brown; staminode pale green with deep green veins centrally; dorsal sepal ovate, 4–6 cm long, 2.8–4.2 cm wide, acuminate at apex, ciliate, puberulous abaxially; synsepal ovate-lanceolate or lanceolate, 4–5 cm long, 2.5–3 cm wide, acute or acuminate at apex, ciliate; petals spreading horizontally to slightly drooping, suboblong or oblong-lanceolate, 5–6 cm long, 1.5–2 cm wide, short-acuminate at apex, long-ciliate; lip helmet-shaped, warty on its incurved side-lobes; pouch ellipsoid-ovoid, 2–3 cm long, 2–2.4 cm wide, slightly puberulous outside; staminode obcordate-lunate, 9–10 mm long, 13–15 mm wide, apically with a small central tooth and two incurved lateral teeth, puberulous adaxially. $2n=41, 44$ (?).

Flowering period: December to March in the wild.

Distribution: W Yunnan (Lushui county and NW Baoshan city); N Myanmar.

Habitat: In grassy and bushy places on wooded slopes or forest margins along valleys at an elevation between 1200 and 2500 m.

Note: *Paphiopedilum* × *yingjiangense* Z. J. Liu & S. C. Chen was described recently [in Acta Bot. Yunnan. 29 (3): 289. 2007]. The plant was collected from Yingjiang county of southwestern Yunnan, and was considered to be a natural hybrid between this species and *P. villosum*. Besides, an albino form of this species, f. *alboviride* (Gruss & Roeth) Braem, was described in 1998.

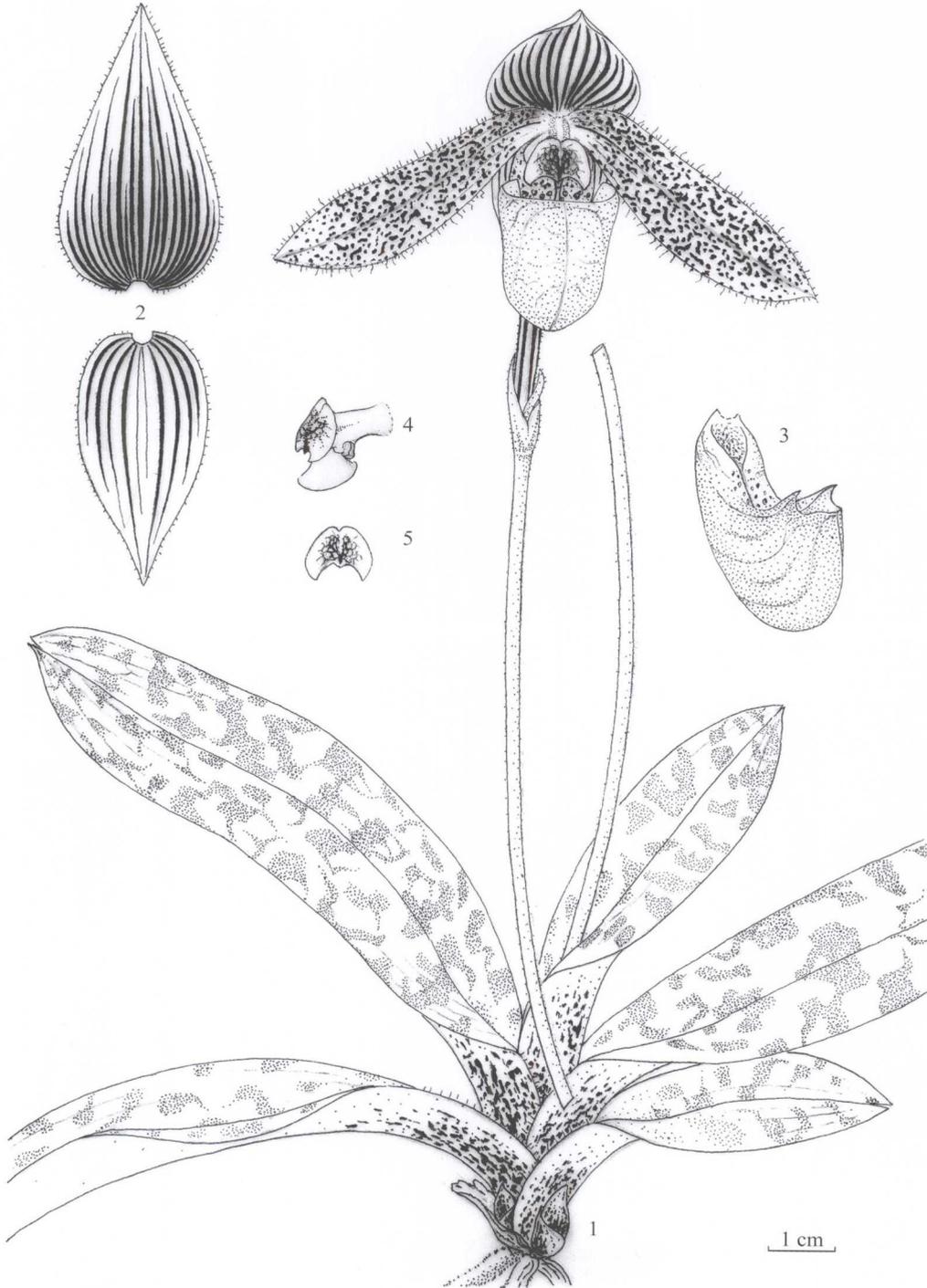


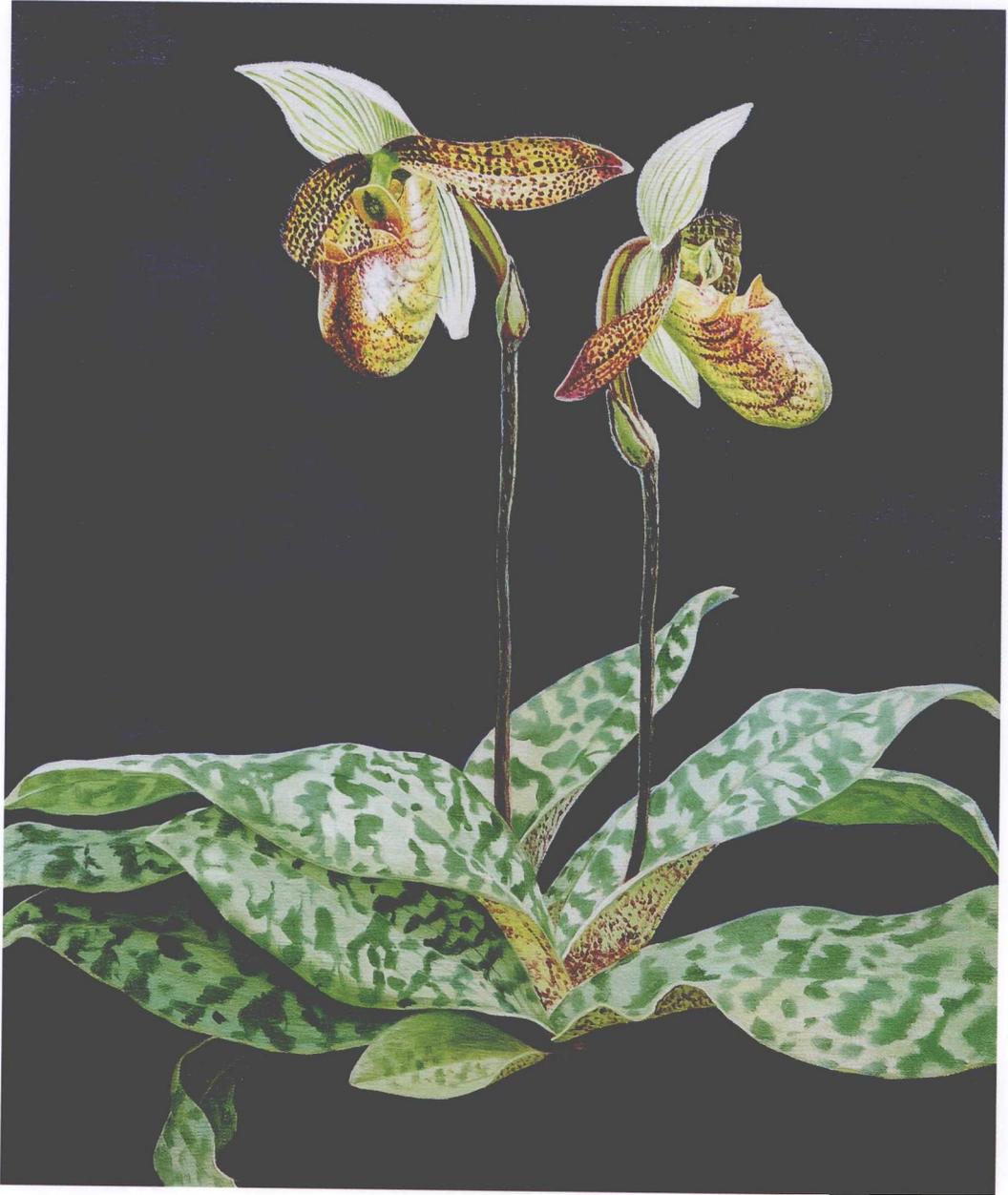
图 5-88. 彩云兜兰: 1. 带花植株; 2. 中萼片与合萼片; 3. 唇瓣, 侧面观; 4. 蕊柱; 5. 退化雄蕊
Fig. 5-88. *Paphiopedilum wardii*: 1. Flowering plant; 2. Dorsal sepal and synsepal; 3. Lip, side view; 4. Column; 5. Staminode



图 5-89. 彩云兜兰：a. 在云南西部的自然生境；b. 在云南西部野外开花
Fig. 5-89. *Paphiopedilum wardii*: a. Its natural habitat in western Yunnan; b. Flowering in the wild in western Yunnan



图 5-90. 彩云兜兰: a-c. 生于云南西部的自然生境中; d. 在栽培中开花
Fig. 5-90. *Paphiopedilum wardii*: a-c. Growing in its natural habitat in western Yunnan; d. Flowering in cultivation



图版 17. 彩云兜兰
Plate 17. *Paphiopedilum wardii*

油画 作者: 李丝云
Oil painting by Si -yun Li

25. 秀丽兜兰 (图5-91, 92, 93) (Fig. 5-91, 92, 93)

Paphiopedilum venustum (Wall. ex Sims) Pfitzer in Jahrb. Wiss. Bot. 19: 163. 1888, et in Engler, Pflanzenreich IV (50) Heft 12: 81. 1903; G. M. Pradhan in Orchid Digest 38: 195. 1974; U. C. Pradhan in Orchid Digest 40: 92, 185. 1976; P. J. Cribb, Gen. Paphiopedilum: 211. 1987, et Gen. Paphiopedilum (ed. 2): 392. 1988; Braem, Paphiopedilum: 138. 1988; S. C. Chen & Z. H. Tsi, Orch. China: 124. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 2: 272. 1999; S. C. Chen in K. Y. Lang (ed. 2), Flora Reipubl. Popul. Sin. 17: 71. 1999. **Type:** Bangladesh, Sylhet, Wallich 7023 (holotype, K!).

Cypripedium venustum Wall. ex Sims in Curtis's Bot. Mag. 47: t. 2129. 1820.

Stimegas venustum (Wall. ex Sims) Rafin., Fl. Tell. 4: 45. 1838.

Cypripedium pardinum Rchb. f. in Gard. Chron.: 554. 1869. **Type:** cult. Veitch (holotype, K!).

Cypripedium venustum Wall. ex Sims var. *pardinum* (Rchb. f.) Rchb. f. in Gard. Chron.: 382. 1887.

Paphiopedilum pardinum (Rchb. f.) Pfitzer in Bot. Jahrb. Syst. 19: 40. 1894.

Paphiopedilum venustum var. *pardinum* (Rchb. f.) Pfitzer in Engler, Pflanzenreich IV(50) Heft 12: 82. 1903.

Cordula venusta (Wall. ex Sims) Rolfe in Orchid Rev. 20: 2. 1912.

Paphiopedilum venustum var. *bhutanense* Pradhan in Ind. Orch. Guide Identif. Cult. 2: 675. 1979.

Paphiopedilum venustum var. *rubrum* Pradhan in Ind. Orch. Guide Identif. Cult. 2: 675. 1979.

Paphiopedilum venustum var. *teetaense* Pradhan in Ind. Orch. Guide Identif. Cult. 2: 675. 1979.

地生植物。叶4—5枚，矩圆状椭圆形或近矩圆形，长10—22 cm，宽2.5—5.7 cm，上面有深绿色与灰绿色或浅褐绿色相间的网格斑，背面密生紫色斑点，先端急尖并2浅裂。花葶直立，长12—19（—23）cm，浅紫褐色，被短硬毛；苞片卵状披针形，长1.7—2.5 cm，边缘具缘毛，背面疏被短柔毛；花梗和子房长4.2—5.3 cm，被短柔毛；花单朵或罕有2朵，直径7—8 cm；中萼片与合萼片白色，具绿色纵脉；花瓣下半部浅黄绿色并有深绿色脉，上半部浅紫褐色，从基部至全长2/3处具少数栗色的疣状突起；唇瓣和退化雄蕊浅黄色，稍有浅紫褐色晕，有明显的绿色脉纹；中萼片宽卵形或卵状心形，长2.5—3.4 cm，宽2.1—3.5 cm，先端急尖，边缘有缘毛，背面特别是沿中脉被短柔毛；合萼片卵形，长2.3—3.2 cm，宽1.4—1.6 cm，先端急尖，边缘有缘毛，背面被短柔毛；花瓣近矩圆状倒披针形，长3.5—5 cm，宽1.2—1.4 cm，先端急尖或钝，具长缘毛，上半部边缘波状；唇瓣盔状，内弯的侧裂片上具疣状突起；囊椭圆状卵形，长2.2—3 cm，宽2—2.5 cm，囊口两侧呈耳状；退化雄蕊肾状倒心形，

长6—7 mm, 宽9—13 mm, 被微柔毛, 先端具宽阔的弯缺并在中央有1个短尖头。
 $2n=40, 42$ 。

花期: 野外为1—3月。

分布: 西藏东南部至南部(墨脱县和定结县); 孟加拉国、不丹、印度(东北部、锡金)、尼泊尔。

生境: 生于灌丛中或林缘腐殖质丰富之地; 海拔1100—1600 m。

说明: U. C. Pradhan曾在1975年和1979年命名一些变种, 但这些变种或是未经合格发表或是未能得到普遍的认可。今天只有1个变型, 亦即米氏变型[f. *measuresianum* (hort.) Braem] (1998) 得到普遍承认。也有人建议承认另一个变型: 豹斑变型[f. *pardinum* (Rchb.f.) Braem] (1999)。

Terrestrial plants. Leaves 4–5, oblong-elliptic or suboblong, 10–22 cm long, 2.5–5.7 cm wide, adaxially tessellated with dark green and grey- or brownish-green, abaxially densely purple-spotted, acute and bilobulate at apex. Scape erect, 12–19(–23) cm long, pale purple-brown, shortly hirsute; bract ovate-lanceolate, 1.7–2.5 cm long, ciliate, abaxially sparsely pubescent; pedicel and ovary 4.2–5.3 cm long, pubescent; flowers single or rarely 2, 7–8 cm across; dorsal sepal and synsepal white longitudinally veined with green; petals pale yellow-green with deeper veins in basal half, pale purple-brown in apical half, with a few large maroon warts in basal two thirds; lip and staminode pale yellow, slightly tinged with pale purple-brown and distinctly veined with green; dorsal sepal broadly ovate or ovate-cordate, 2.5–3.4 cm long, 2.1–3.5 cm wide, acute at apex, ciliate, abaxially pubescent particularly along midvein; synsepal ovate, 2.3–3.2 cm long, 1.4–1.6 cm wide, acute at apex, ciliate, pubescent abaxially; petals suboblong-oblongate, 3.5–5 cm long, 1.2–1.4 cm wide, acute or obtuse at apex, long-ciliate, undulate-margined in apical half; lip helmet-shaped, warty on its incurved side-lobes; pouch ellipsoid-ovoid, 2.2–3 cm long, 2–2.5 cm wide, auriculate on both sides of its mouth; staminode reniform-obcordate, 6–7 mm long, 9–13 mm wide, puberulous, with a broad sinus and a central mucro at apex. $2n=40, 42$.

Flowering period: January to March in the wild.

Distribution: SE to S Xizang (Medog county and Dingjie county); Bangladesh, Bhutan, India (NE and Sikkim), Nepal.

Habitat: In humus-rich places in thickets or on forest margins at an elevation between 1100 and 1600 m.

Note: Some varieties of this species were proposed by U. C. Pradhan in 1975 and 1979, but they were either invalid names or have not won wide recognition. Today only one form of this species is widely recognized: f. *measuresianum* (hort.) Braem (1998). Someone proposed recognizing another form: f. *pardinum* (Rchb. f.) Braem (1999).

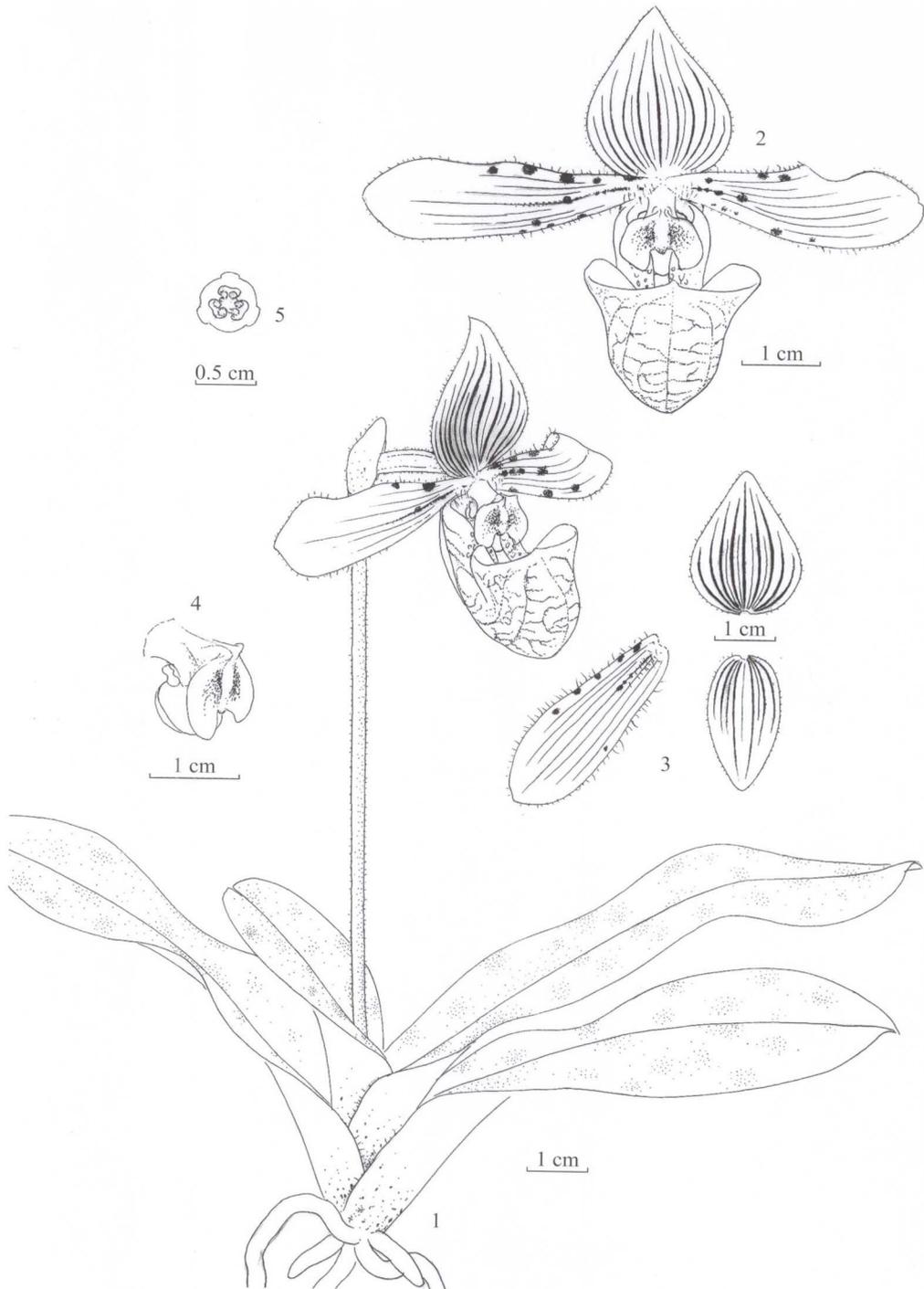


图 5-91. 秀丽兜兰: 1. 带花植株; 2. 花; 3. 中萼片、合萼片与花瓣; 4. 蕊柱, 侧面观; 5. 子房横切面

Fig. 5-91. *Paphiopedilum venustum*: 1. Flowering plant; 2. Flower; 3. Dorsal sepal, synsepal and petal; 4. Column, side view; 5. Ovary cross section



图 5-92. 秀丽兜兰：在西藏东南部自然生境中开花
Fig. 5-92. *Paphiopedilum venustum*: Flowering in its natural habitat in Southeast Xizang



图 5-93. 秀丽兜兰: a-c. 在栽培中开花

Fig. 5-93. *Paphiopedilum venustum*: a-c. Flowering in cultivation

26. 长瓣兜兰 (图5-94, 95, 96; 图版18) (Fig. 5-94, 95, 96; Pl. 18)

Paphiopedilum dianthum T. Tang & F. T. Wang in Bull. Fan Mem. Inst. Biol. Bot. Ser. 10: 24. 1940; F. Mark in Orchid Digest 51: 78. 1987; P. J. Cribb, Gen. Paphiopedilum (ed. 2): 189. 1998; S. C. Chen & Z. H. Tsi, Orch. China: 119. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 136. 1998; S. C. Chen, Z. H. Tsi & Y. B. Luo, Native Orch. China Colour: 329. 1999; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 61. 1999; Aver. et al., Slipper Orch. Vietnam: 244. 2003.
Type: China, Yunnan, Mengtze, C. W. Wang 83446 (holotype, PE!).

Paphiopedilum parishii (Rchb. f.) Stein var. *dianthum* (T. Tang & F. T. Wang) Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 38. 1982; P. J. Cribb & C. Z. Tang in The Plantsman 4: 170. 1982; Braem, Paphiopedilum: 105. 1988.

石上附生植物。叶4—6枚，宽带形或舌状，厚革质，长15—30（—50）cm，宽3—5 cm，上面暗绿色，背面浅绿色，干后常呈棕红色，先端钝圆并有不等的2浅裂。花葶外弯或近直立，长30—80 cm，绿色，无毛或较少略被短柔毛；总状花序具（1—）2—5花；苞片宽卵形，无毛，长1.3—2.9 cm，浅绿色或浅黄绿色；花梗和子房长4—5.5 cm，绿色，无毛；花直径8—10 cm，花被在果期仍宿存；中萼片白色而有绿色的基部；合萼片浅绿黄色或绿白色，有暗绿色脉；花瓣绿白色或淡黄绿色并有深色条纹或褐红色晕；唇瓣浅黄褐色，有深色晕或脉纹；退化雄蕊绿白色而有深绿色中央斑块；中萼片倒卵状椭圆形，长4—5.5 cm，宽1.8—2.5 cm，先端短渐尖，下部边缘向后弯卷；合萼片与中萼片相似，但稍宽而短；花瓣向下弯垂，长带形，向先端渐狭，长7—12 cm，宽7—10 mm，扭曲，从中部至基部边缘波状且常可见数个具毛或无毛的黑色疣状突起，有时在边缘还有少数毛丛或长毛；唇瓣盔状，基部的柄内密生棕黑色的毛；囊近倒卵形，长2.5—3 cm，宽2—2.5 cm，囊口两侧呈耳状；退化雄蕊倒心形或倒卵形，长1—1.2 cm，宽7—9 mm，先端有弯缺或略呈3浅裂，上面基部有1个角状突起物，边缘具细缘毛。蒴果近椭圆形，长达4 cm，宽约1.5 cm。2*n*=26。

花期：野外为7—10月。

分布：广西西部、贵州西南部、云南东南部至南部；越南北部。

生境：石灰岩地区常绿阔叶林下或灌木林下的岩石上或荫蔽的岩壁上；海拔（550—）1000—2250 m。

说明：格鲁兜兰（杂种）*Paphiopedilum* × *grussianum* S. Hua Hu [in Die Orchidee 49 (4): 180. 1998]被认为是该种与带叶兜兰（*P. hirsutissimum*）之间的天然杂种。该杂种产于广西西北部，其亲本亦见于该处。另一个为该种与紫毛兜兰（*P. villosum*）之间的天然杂种：黄氏兜兰（杂种）（*Paphiopedilum* × *petchleungianum* Gruss）[in Die Orchidee 52 (4): 398, 2001]，产于云南东南部。此外，该种之下于2003年还曾发表一个白化型，即白花变型（f. *album* Gruss）。

Lithophytic plants. Leaves 4—6, broadly lorate or ligulate, thick-coriaceous, 15—30 (—50) cm long, 3—5 cm wide, adaxially dark green, abaxially pale green, often turning

brown-red when dried, obtuse-rounded and slightly unequal-bilobulate at apex. Scape arching to suberect, 30–80 cm long, green, glabrous or very sparsely pubescent; raceme with (1–)2–5 flowers; bracts broadly ovate, glabrous, 1.3–2.9 cm long, pale green or pale yellow-green; pedicel and ovary 4–5.5 cm long, green, glabrous; flowers 8–10 cm across, with their perianth persistent until fruiting; dorsal sepal white, tinged and veined with green toward the base; synsepal pale green-yellow or greenish-white with dark green veins; petals whitish-green or pale yellow-green, with darker stripes or flushed with brownish-red; lip pale yellow-brown darker-flushed and veined; staminode greenish-white with a dark green center; dorsal sepal obovate-elliptic, 4–5.5 cm long, 1.8–2.5 cm wide, shortly acuminate at apex, lower margins recurved, adaxially short-hirsute toward the base; synsepal similar to dorsal sepal, slightly shorter and broader; petals decurved-pendent, linear-tapering, 7–12 cm long, 7–10 mm wide, twisted, basal half undulate-margined and often with a few blackish warts, sometimes with a few clusters of hairs or long hairs; lip helmet-shaped, basal claw with brown-black hairs inside; pouch obovoid, 2.5–3 cm long, 2–2.5 cm wide, auriculate on both sides of its mouth; staminode obcordate or obovate, 10–12 mm long, 7–9 mm wide, with a deep sinus or somewhat trilobulate at apex and a horn-shaped protuberance near its adaxial base, minutely ciliate. Capsules ellipsoid, ca. 4 cm long, 1.5 cm wide. $2n=26$.

Flowering period: July to October in the wild.

Distribution: W Guangxi, SW Guizhou, SE to S Yunnan; N Vietnam.

Habitat: On rocks in evergreen broad-leaved forests or thickets or shady cliffs in limestone areas at an elevation of (550–) 1000–2250 m.

Note: *Paphiopedilum* × *grussianum* S. Hua Hu [in *Die Orchidee* 49(4): 180, 1998] was considered to be a natural hybrid between this species and *P. hirsutissimum*. It was found in northwestern Guangxi of China, where its parental species also occurred. Another one is *P.* × *petchleungianum* Gruss [in *Die Orchidee* 52(4): 398, 2001], a natural hybrid between this species and *P. villosum*, described from Southeast Yunnan. Besides, an albino form of this species, f. *album* Gruss, was described in 2003.

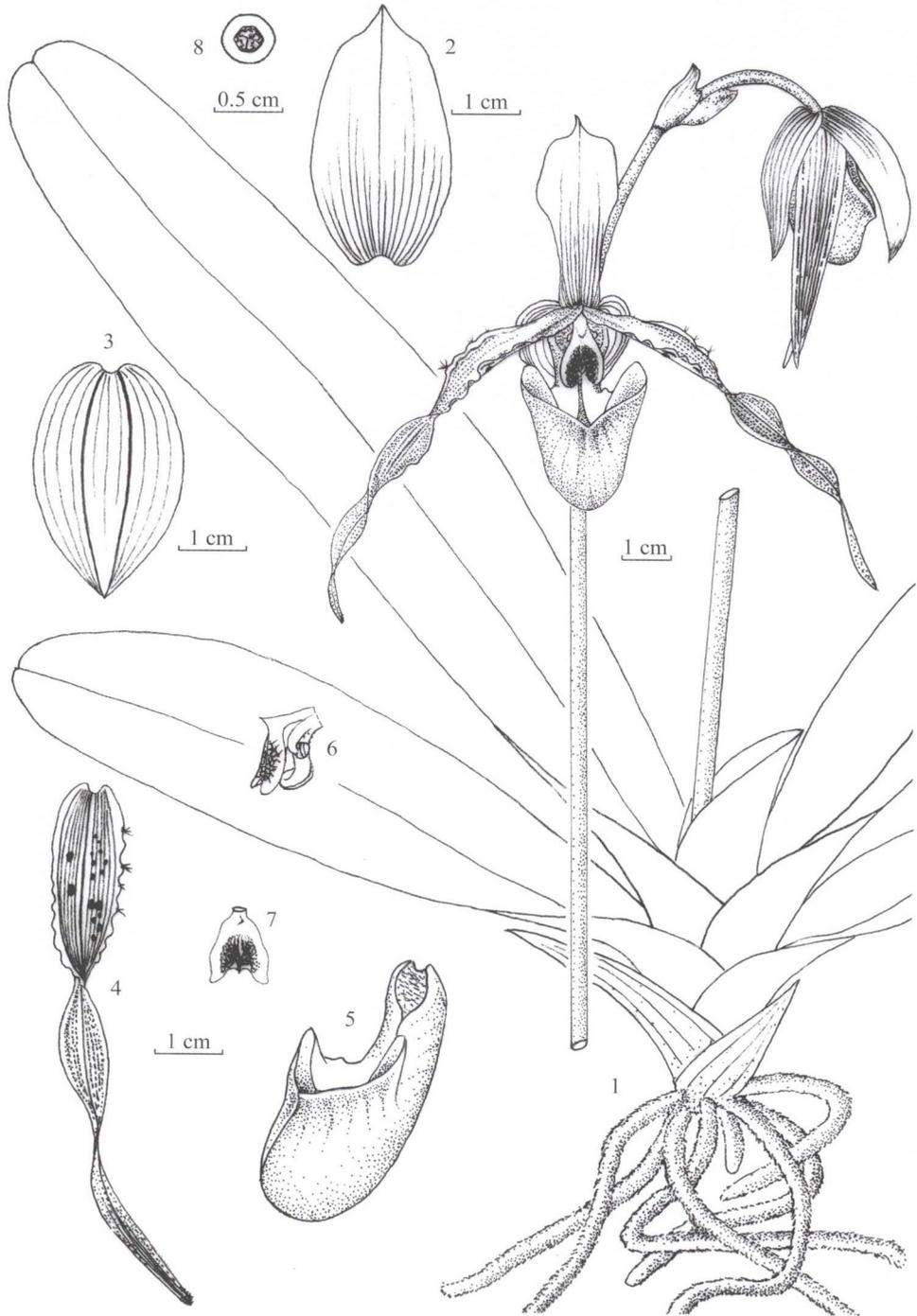


图 5-94. 长瓣兜兰: 1. 带花植株; 2. 中萼片; 3. 合萼片; 4. 花瓣; 5. 唇瓣; 6. 蕊柱; 7. 退化雄蕊; 8. 子房横切面

Fig. 5-94. *Paphiopedilum dianthum*: 1. Flowering plant; 2. Dorsal sepal; 3. Synsepal; 4. Petal; 5. Lip; 6. Column; 7. Staminode; 8. Ovary cross section



图 5-95. 长瓣兜兰: a. 在云南东南部的自然生境; b. 在云南东南部野外开花
Fig. 5-95. *Paphiopedilum dianthum*: a. Its natural habitat in Southeast Yunnan; b. Flowering in the wild in Southeast Yunnan

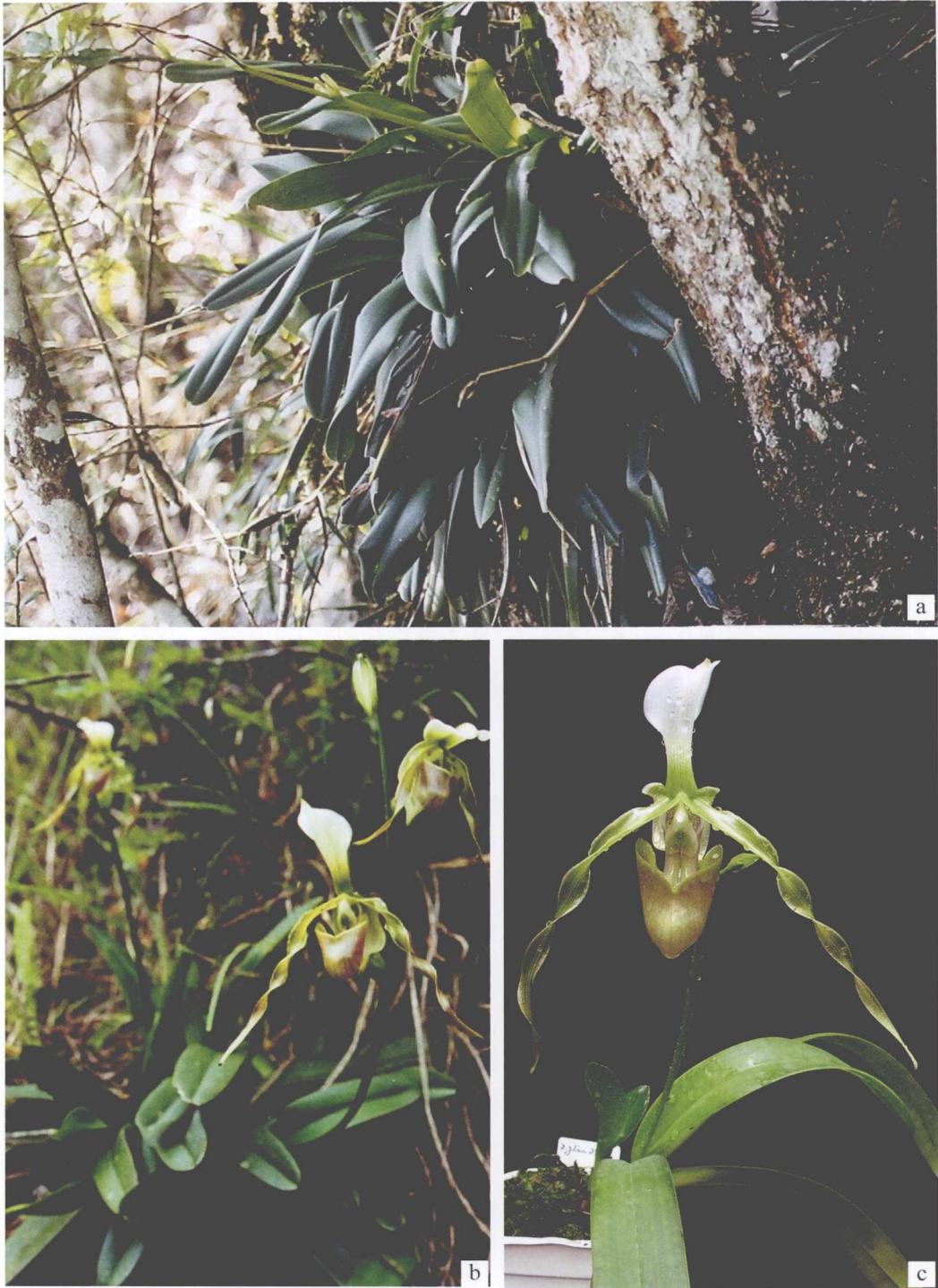


图 5-96. 长瓣兜兰: a, b. 生于贵州西南部的自然生境中; c. 在栽培中开花

Fig. 5-96. *Paphiopedilum dianthum*: a, b. Growing in its natural habitat in Southwest Guizhou; c. Flowering in cultivation



图版 18. 长瓣兜兰
Plate 18. *Paphiopedilum dianthum*

油画 作者: 李丝云
Oil painting by Si -yun Li

27. 飘带兜兰 (图5-97, 98, 99; 图版19) (Fig. 5-97, 98, 99; Pl. 19)

Paphiopedilum parishii (Rchb. f.) Stein, Orchideenbuch: 479. 1892; Pfitzer in Bot. Jahrb. Syst. 19: 41. 1894, et in Engler, Pflanzenreich IV(50) Heft 12: 65. 1903; Veraurai in Orchid Digest 38: 211. 1974; P. J. Cribb, Gen. Paphiopedilum: 119. 1987, et Gen. Paphiopedilum (ed. 2): 185. 1998; Braem, Paphiopedilum: 102. 1988; Z. H. Tsi & S. C. Chen in Acta Phytotax. Sin. 33 (3): 295. 1995; S. C. Chen & Z. H. Tsi, Orch. China: 124. 1997; Braem, C. Baker & M. Baker, Gen. Paphiopedilum Nat. Hist. Cult. 1: 124. 1998; S. C. Chen in K. Y. Lang (ed.), Flora Reipubl. Popul. Sin. 17: 61. 1999. **Type:** Myanmar, Parish s. n. (holotype, W; isotype K!).

Cypripedium parishii Rchb. f. in Flora 52: 322. 1869; Hook. f. in Curtis's Bot. Mag. 95: t. 5791. 1869.

Selenipedium parishii (Rchb. f.) Jolibois in Rev. Hort. 57: 132. 1885.

Paphiopedilum parishii (Rchb. f.) Pfitzer in Engler, Bot. Jahrb. 19: 41. 1894.

Cordula parishii (Rchb. f.) Rolfe in Orchid Rev: 20: 2. 1912.

树上或石上附生植物。叶5—8枚，带形，厚革质，长15—40 cm，宽2.5—5 cm，先端浑圆并有不等的2浅裂，上面深绿色，背面浅绿色或浅黄绿色。花葶外弯或近直立，长23—40（—60）cm，绿色，密生白色短柔毛；总状花序具3—5（—8）花；苞片绿色，宽卵状椭圆形，长2.5—4 cm，宽1.5—3 cm，边缘具缘毛；花梗和子房长3.5—4.5 cm，被长柔毛；花直径8—10 cm，花被在受粉后脱落；中萼片与合萼片淡黄绿色并有绿色脉；花瓣基部至中部淡绿黄色并有栗色斑点和边缘，中部至末端为浅紫栗色并有深色边缘；唇瓣浅黄绿色，有时有紫栗色晕，具较深色脉纹；退化雄蕊白色，中央具绿色斑；中萼片椭圆形，长3—5 cm，宽2—3 cm，先端急尖，基部边缘向后弯，上面近基部和先端多少被细柔毛，边缘具缘毛；合萼片与中萼片相似，略小，先端钝；花瓣向下弯垂，线形，向先端渐狭，长8—10 cm，宽6—10 mm，先端浑圆，两面具栗色腺毛，上半部扭转，下半部边缘波状，基部下半侧边缘有时有少数栗色斑点或具毛的疣状突起；唇瓣盔状，基部的柄内具栗色毛；囊近卵形或近卵状圆锥形，长1.5—3 cm，宽1.5—2 cm，囊口两侧呈耳状；退化雄蕊倒心形或倒卵形，长1—1.5 cm，宽7—8 mm，先端具弯缺，上面近基部具1角状突起物。 $2n=26$ 。

花期：野外为5—6月。

分布：云南西南部至南部（耿马县和勐腊县）；缅甸、泰国。

生境：常绿阔叶林中树干上或岩石上；海拔1000—1300 m。

说明：此种与长瓣兜兰的区别在于它的叶较坚挺；花序柄较短且密被白色毛；子房具长柔毛；花瓣色较深，两面被腺毛；花被在受粉后脱落。

Epiphytic or lithophytic plants. Leaves 5–8, lorate, thick-coriaceous, 15–40 cm long, 2.5–5 cm wide, rounded and slightly unequally bilobulate at apex, dark green adaxially, pale green or pale yellow-green abaxially. Scape arching or suberect, 23–40(–60) cm long, green, densely white-pubescent; inflorescence with 3–5(–8) flowers; bracts green, broadly ovate-

elliptic, 2.5–4 cm long, 1.5–3 cm wide, ciliate; pedicel and ovary 3.5–4.5 cm long, densely villose; flowers 8–10 cm across, with perianth dropping off on pollination; dorsal sepal and synsepal pale yellow-green with green veins; petals pale yellow-green and with deep maroon spots and margins in basal half and light purplish-maroon and darker-margined in apical half; lip pale yellow-green, sometimes flushed with purplish-maroon, darker-veined; staminode whitish with a green center; dorsal sepal elliptic, 3–5 cm long, 2–3 cm wide, acute at apex, basal margins recurved, adaxially more or less puberulous toward the base and apex; synsepal similar to dorsal sepal, slightly smaller, obtuse at apex; petals decurved-pendulous, linear-tapering, 8–10 cm long, 6–10 mm wide, rounded at apex, with maroon glandular hairs on both surfaces, twisted in apical half, undulate-margined in basal half, sometimes with several maroon spots or hairy warts on the basal margin of the lower side; lip helmet-shaped, basal claw maroon-hairy inside; pouch subovoid or nearly ovoid-conicle, 1.5–3 cm long, 1.5–2 cm wide, auriculate on both sides of its mouth; staminode obcordate or obovate, 10–15 mm long, 7–8 mm wide, with a deep sinus at apex and a horn-shaped protuberance near its adaxial base. $2n=26$.

Flowering period: May and June in the wild.

Distribution: SW to S Yunnan (Gengma county and Mengla county); Myanmar, Thailand.

Habitat: On tree trunks or rocks in broad-leaved forests at an elevation between 1000 and 1300 m.

Note: This species differs from *P. dianthum* by having rather stiff leaves, shorter and densely white-hairy peduncle, villose ovary, deeper-colored petals covered with glandular hairs on both surfaces and that the perianth drops off on pollination.

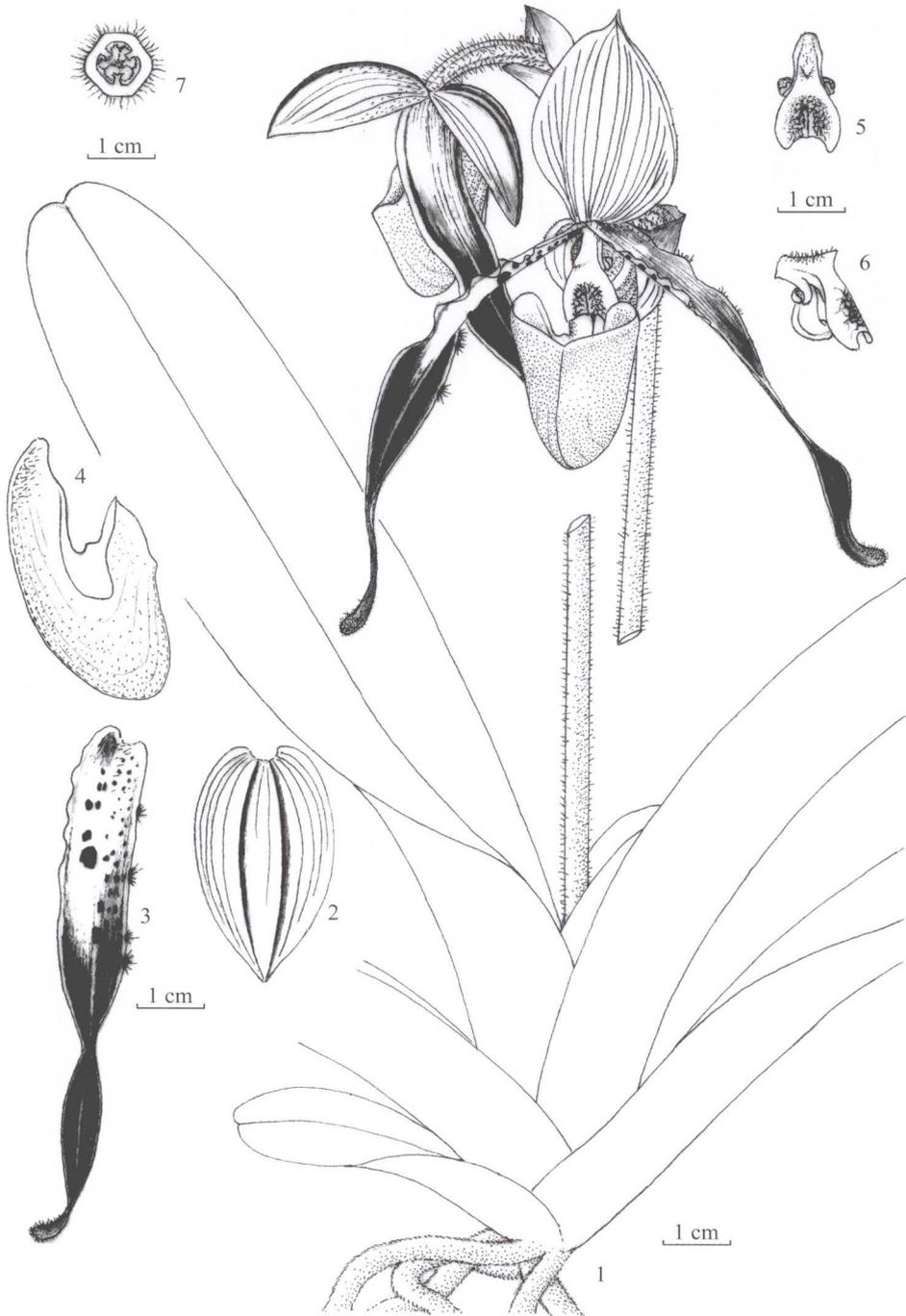


图 5-97. 飘带兜兰: 1. 带花植株; 2. 合萼片, 背面观; 3. 花瓣, 正面观; 4. 唇瓣, 纵切面; 5. 蕊柱, 正面观; 6. 蕊柱, 侧面观; 7. 子房横切面

Fig. 5-97. *Paphiopedilum parishii*: 1. Flowering plant; 2. Synsepal, back view; 3. Petal, front view; 4. Lip, longitudinal section; 5. Column, front view; 6. Column, side view; 7. Ovary cross section

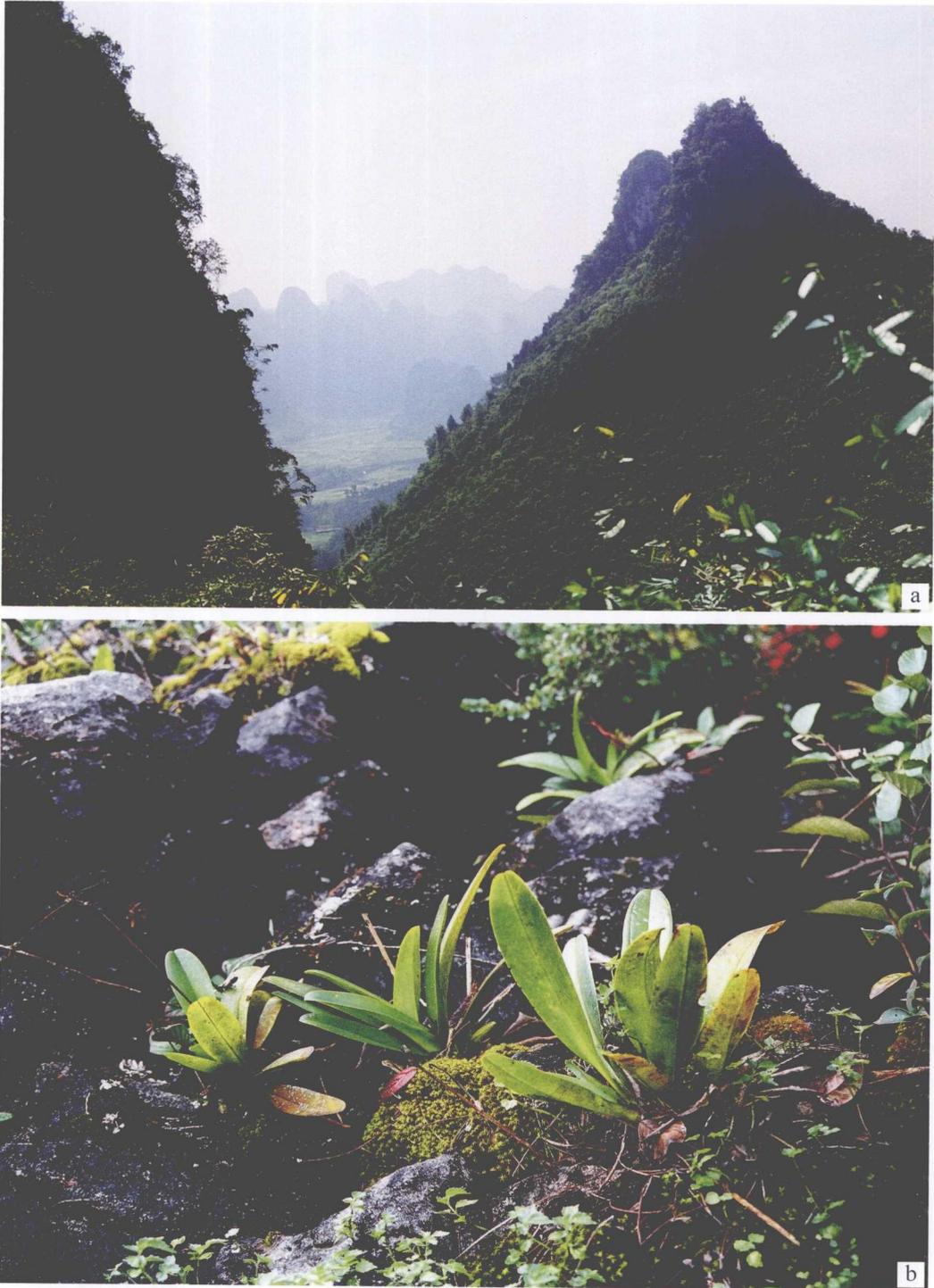
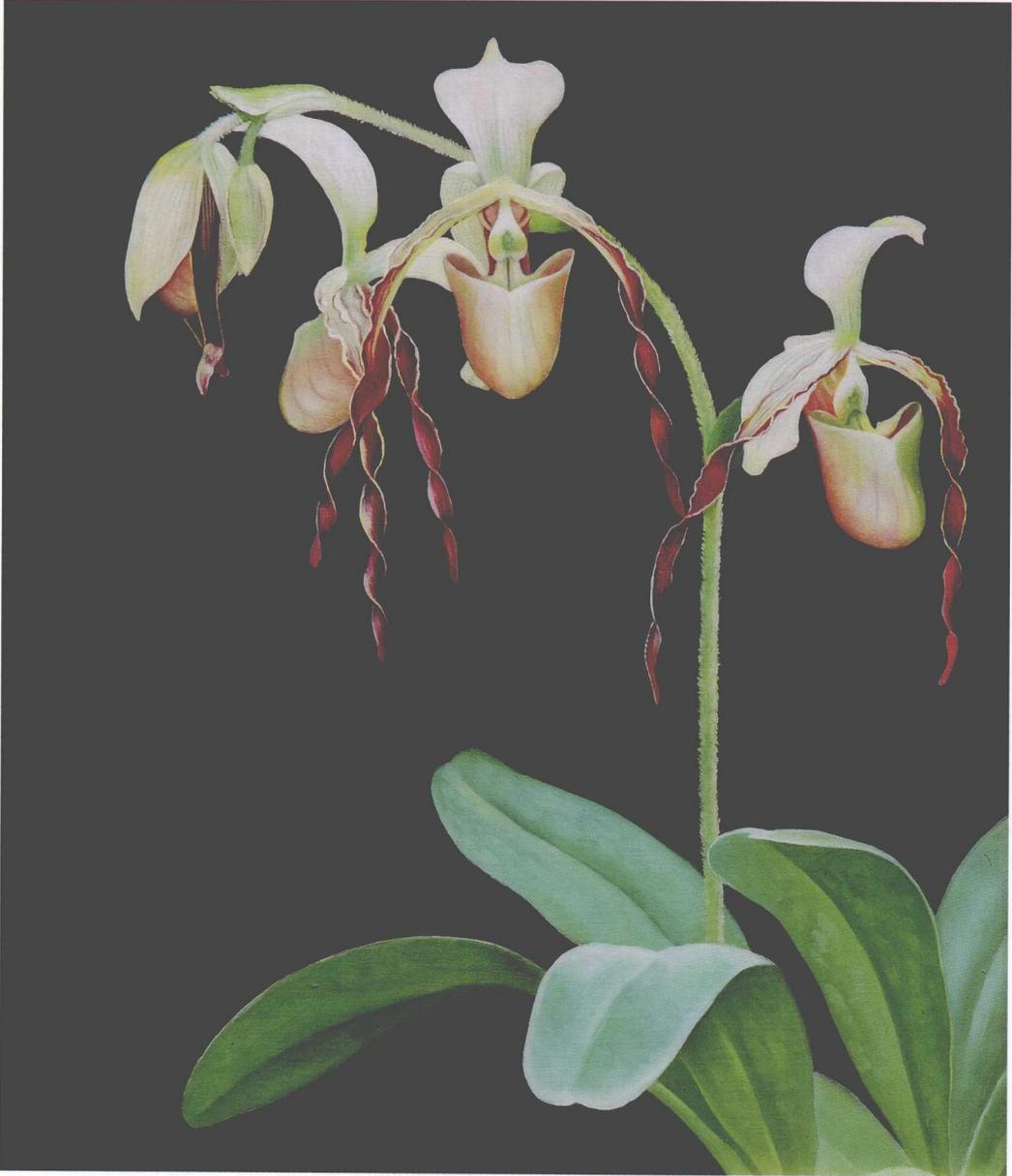


图 5-98. 飘带兜兰: a. 在云南南部的自然生境; b. 生于云南南部的自然生境中
Fig. 5-98. *Paphiopedilum parishii*: a. Its natural habitat in southern Yunnan; b. Growing in its natural habitat in southern Yunnan



图 5-99. 飘带兜兰: a, c, d. 在栽培中开花; b. 幼果
Fig. 5-99. *Paphiopedilum parishii*: a, c, d. Flowering in cultivation; b. Young fruit



图版 19. 飘带兜兰
Plate 19. *Paphiopedilum parishii*

油画 作者: 李丝云
Oil painting by Si -yun Li

第六章 杂交情况

HYBRIDIZATION

一、天然杂种 Natural hybrids

在兜兰属植物中，有不少种类生长在相同的地域和相近的生境中，特别是在石灰岩地区。例如，在云南的东南部，经常可以看到硬叶兜兰 (*P. micranthum*) 与麻栗坡兜兰 (*P. malipoense*)、小叶兜兰 (*P. barbigerum*) 与长瓣兜兰 (*P. dianthum*)、同色兜兰 (*P. concolor*) 与巨瓣兜兰 (*P. bellatulum*)、硬叶兜兰与带叶兜兰 (*P. hirsutissimum*) 等，生长在一起。兜兰属的种间杂交大多是能育的，而传粉媒介又未必十分专一，因此存在大量天然杂种的现象，也是顺理成章的。

早在1890年，R. A. Rolfe就描述了一种叫 *Cypripedium* (*Paphiopedilum*) × *siamense* 的天然杂种，并指明它的亲本是泰国产的胼胝兜兰 (*P. callosum*) 与卷萼兜兰 (*P. appletonianum*)。许多中国近代文献中的 *P. concolor*-*bellatulum* 或误称 “*P. godefroyae*” (陈心启和刘芳媛, 1982; Mark, 1987)，实际上都是同色兜兰 (*P. concolor*) 与巨瓣兜兰 (*P. bellatulum*) 之间的天然杂种。同色兜兰与巨瓣兜兰在云南是广布种，两者均见于文山地区；前者花期为6—8月，分布于海拔300—1400 m之间，而后者花期为4—6月，海拔为1000—1800 m。两者花期有交叉，分布亦有重叠，故天然杂种甚为常见，甚至有一系列的过渡类型，很难予以划分开来。

1992年由H. Koopowitz与N. Hasegawa描述的杂种美花兜兰 (杂种) *Paphiopedilum* × *fanaticum* 被认为是硬叶兜兰与麻栗坡兜兰之间的天然杂种。此两种植物常生长在一起，麻栗坡兜兰的花期较早，在野外为1—4月，而硬叶兜兰为3—5月。两者花期有重叠，杂交更无障碍，出现天然杂种自是意想中的事。

1998年由胡松华发表的格鲁兜兰 (杂种) *Paphiopedilum* × *grussianum* 来自广西，原作者认为是带叶兜兰与长瓣兜兰之间的杂种，其亲本均见于广西西部。

2001年由O. Gruss发表的黄氏兜兰 *Paphiopedilum* × *petchleungianum* 系来自云南文山，被认为是当地产的长瓣兜兰与紫毛兜兰 (*P. villosum*) 之间的天然杂种。但他同时发表的另一个所谓天然杂种 *Paphiopedilum* × *areeanum* 则根据不足。它来自云南潞西，O. Gruss推测它的亲本为小叶兜兰与紫毛兜兰，但此两种在潞西未有记录。随后证实 *Paphiopedilum* × *areeanum* 与我们发表的缅甸植物根茎兜兰 (*P. rhizomatousum*) 为同一物，应是分布于缅甸至云南西部的一个野生种。

兜兰属中天然杂种的发现从没有间断过。2002年间O. Gruss与A. Petchleung发表的维腾兜兰 (杂种) *Paphiopedilum* × *vietenryanum* 来自云南文山，被认为是亨利兜兰 (*P. henryanum*) 与格力兜兰 (*P. gratrixianum*) 之间的天然杂种；2004年由刘仲健

和陈心启发现的中华紫毛兜兰（杂种）*Paphiopedilum* × *sinovillosum*产于云南麻栗坡，被认为是紫毛兜兰与亨利兜兰（*P. henryanum*）之间的天然杂种。后两种也产于麻栗坡。2006年由O. Gruss与H. Perner命名的格蓝兜兰（杂种）*Paphiopedilum* × *glanzii*是具有相当观赏价值的天然杂种，其亲本被推测是硬叶兜兰与白花兜兰（*P. emersonii*）。这两个种已被杂交育成人工杂种，叫*Paph. Lola Bird*，是由著名的兜兰育种家Franz Glanz杂交培育出来的。天然杂种与人工杂种的花几乎完全一样，故此以Glanz命名。2007年由刘仲健和陈心启发现并命名的盈江兜兰（杂种）*Paphiopedilum* × *yingjiangense*被认为是紫毛兜兰与彩云兜兰（*P. wardii*）之间的天然杂种，产于云南西南部的盈江。目前，我国已知的天然杂种达10种之多，本章将予以详细介绍。

二、国产天然杂种

Natural hybrids found in China

1. 美花兜兰（杂种）（图6-1）（Fig. 6-1）

Paphiopedilum* × *fanaticum Koop. & N. Haseg. in *Orchid Advocate* 18: 50. 1992.

叶4—5枚，矩圆状椭圆形，长10—20 cm，宽4—6 cm，上面有深浅绿色相间的网格斑，背面有密集的紫色斑点，近基部边缘有长缘毛。花葶长10—30 cm，被长柔毛；苞片长1.2—1.8 cm，背面被长柔毛；花梗和子房被长柔毛；花单朵；萼片与花瓣黄绿色，有紫褐色脉纹；唇瓣绿白色，有模糊的紫色脉纹；退化雄蕊白色，有紫色斑；中萼片卵形，长2.4—2.8 cm，宽1.8—2.4 cm，背面被长柔毛；合萼片略小于中萼片；花瓣宽卵形至近圆形，长3.2—4 cm，宽2.8—4 cm；唇瓣近椭圆状球形，长5.5—6.5 cm，宽4.5—5.2 cm；退化雄蕊宽椭圆形，长约1.5 cm，宽1—1.3 cm。

花期：11月至翌年3月。

分布：云南东南部（麻栗坡县）。

生境：林下腐殖质丰富的土壤上。

亲本：美花兜兰（杂种）*Paphiopedilum* × *fanaticum* 被认为是麻栗坡兜兰（*P. malipoense*）和硬叶兜兰（*P. micranthum*）之间的天然杂种。

Leaves 4–5, oblong-elliptic, 10–20 cm long, 4–6 cm wide, adaxially tessellated with deep and light green, abaxially densely purple-spotted, long-ciliate toward the base. Scape 10–30 cm long, villose; bract 1.2–1.8 cm long, abaxially villose; pedicel and ovary villose;

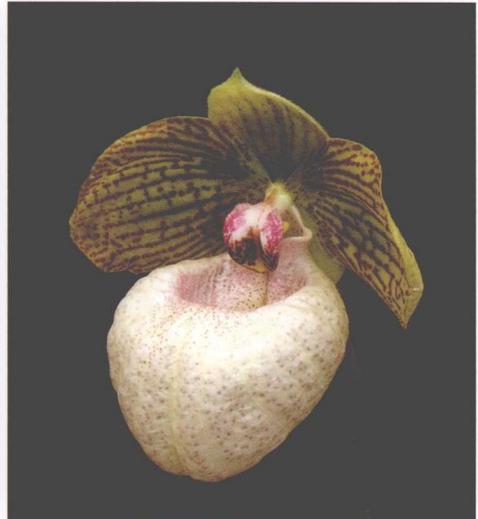


图 6-1. 美花兜兰（杂种）

Fig. 6-1. *Paphiopedilum* × *fanaticum* Koop. & N. Haseg.

flower single; sepals and petals yellow-green, veined with purple-brown; lip green-whitish, obscurely purple-veined; staminode white, marked with purple; dorsal sepal ovate, 2.4–2.8 cm long, 1.8–2.4 cm wide, abaxially villose; synsepal slightly smaller than dorsal sepal; petals broadly ovate to suborbicular, 3.2–4 cm long, 2.8–4 cm wide; lip subellipsoid-globose, 5.5–6.5 cm long, 4.5–5.2 cm wide; staminode broadly elliptic, ca. 1.5 cm long, 1–1.3 cm wide.

Flowering period : November to March.

Distribution: SE Yunnan (Malipo county).

Habitat: In humus-rich soil in forests.

Parents: *Paphiopedilum* × *fanaticum* is considered to be a natural hybrid between *P. malipoense* and *P. micranthum*.

2. 格蓝兜兰 (杂种) (图6-2) (Fig. 6-2)

Paphiopedilum × *glanzii* Gruss & Perner in Die Orchidee 57 (3): 315. 2006.

叶3—4枚，上面略有深浅绿色相间的网格斑。花葶直立；花单朵；中萼片和花瓣与硬叶兜兰 (*P. micranthum*) 的相应器官十分相似，但色泽较淡；唇瓣在质地和色泽上也与硬叶兜兰的相似，但更接近球形且略小；退化雄蕊卵形而且平坦，既不为纵向对摺（如硬叶兜兰中所见），也不具纵向深沟[如白花兜兰 (*P. emersonii*) 中的退化雄蕊]。

花期：春末？

分布：中国，无详细地点。

生境：不详。

亲本：格蓝兜兰 (杂种) *Paphiopedilum* × *glanzii* 被认为是白花兜兰 (*P. emersonii*) 与硬叶兜兰 (*P. micranthum*) 之间的天然杂种。其模式标本原是混在1987年从中国输入德国的一批硬叶兜兰之中的。后来为著名的园艺家 Franz Glanz 所栽培。此植物在多年以后才开花，而且甚似人工杂种 *Paphiopedilum* Lola Bird。后者是 Franz Glanz 用硬叶兜兰与白花兜兰进行杂交而培育成的人工杂种。因而此天然杂种就被命名为“*glanzii*”，以表示对他的敬意。



图 6-2. 格蓝兜兰 (杂种)

Fig. 6-2. *Paphiopedilum* × *glanzii*
Gruss & Perner

Leaves 3–4, adaxially more or less tessellated with deep and light green. Scape erect; flower single; dorsal sepal and petals very similar to those of *P. micranthum*, but paler in color; lip similar in texture and color to that of *P. micranthum*, but more globose and a little smaller; staminode ovate and flat, not longitudinally conduplicate as found in *P. micranthum*, nor deeply longitudinally sulcate as seen in *P. emersonii*.

Flowering period: Deep spring?

Distribution: China, no precise locality.

Habitat: Unknown.

Parents: *Paphiopedilum* × *glanzii* is considered to be a natural hybrid between *P. emersonii* and *P. micranthum*. The type is a plant imported from China to Germany in 1987 in a shipment of *Paphiopedilum micranthum*, and then cultivated by a famous horticulturist Franz Glanz. The plant flowered many years later and looked the same as *Paphiopedilum* Lola Bird, an artificial hybrid of the same parents also by Franz Glanz, after whom the new natural hybrid was named.

3. 格鲁兜兰（杂种）（图6-3）（Fig. 6-3）

Paphiopedilum* × *grussianum S. Hua Hu in Die Orchidee 49 (4): 180. 1998.

叶3—6枚，矩圆状披针形，长20—25 cm，宽3—3.5 cm，绿色。花葶长约20 cm；花序具1—2花；花直径7—9 cm；中萼片白色，近基部有红褐色脉与斑点；合萼片纯白色；花瓣上半部白色，下半部有红褐色脉和晕，近基部有红褐色斑点；唇瓣浅红褐色；退化雄蕊白色，有红褐色斑点；中萼片倒卵状椭圆形，长约4 cm，宽2 cm；合萼片与中萼片相似；花瓣倒披针状匙形，长约6 cm，宽1—2 cm，边缘略波状；唇瓣盔状；囊长约3 cm，宽2 cm；退化雄蕊近三角形。

花期：5月。

分布：广西。

生境：不详。

亲本：格鲁兜兰（杂种）*Paphiopedilum* × *grussianum*被认为是长瓣兜兰（*P. dianthum*）和带叶兜兰（*P. hirsutissimum*）之间的天然杂种。

Leaves 3–6, oblong-lanceolate, 20–25 cm long, 3–3.5 cm wide, green. Scape ca. 20 cm long; inflorescence with 1–2 flowers; flowers 7–9 cm across; dorsal sepal white, veined and spotted with red-brown toward its base; synsepal pure white; petals white on the apical half, veined and tinged with red-brown on the basal half, with red-brown spots toward the base; lip pale red-brown; staminode white spotted with red-brown; dorsal sepal obovate-elliptic, ca. 4 cm long, 2 cm wide; synsepal similar to dorsal sepal; petals oblanceolate-spatulate, ca. 6 cm long, 1–2 cm wide, slightly undulate-margined; lip helmet-shaped; pouch ca. 3 cm long, 2 cm wide; staminode subtriangular.

Flowering period: May.

Distribution: Guangxi.

Habitat: Unknown.

Parents: *Paphiopedilum* × *grussianum* is considered to be a natural hybrid between *P. dianthum* and *P. hirsutissimum*.



图 6-3. 格鲁兜兰（杂种）
Fig. 6-3. *Paphiopedilum* × *grussianum* S. Hua Hu

4. 泸水兜兰 (杂种) 新天然杂种 (图6-4, 5) (Fig. 6-4, 5)

Paphiopedilum* × *lushuiense Z. J. Liu & S. C. Chen, hybr. nat. nov.

Type: China, Yunnan, Lushui county, in rocky place in open forest, alt. ca. 2000 m, 9 January 2003, Z. J. Liu 2679 (holotype, NOCC!).

Hybrida naturalis nova ejus parentibus *Paphiopedilo spiceriano* et *P. villosio* similis, ex illo sepalio intermedio non valde recurvo-marginato, petalis obovato-spatulatis plus quam 2 cm latis, staminodio basi non involuto utrinsecus, e hoc sepalio intermedio albo in dimidio superiore et ad marginem supra late rubiginoso-costati differt.

此新天然杂种与其亲本白旗兜兰 (*P. spicerianum*) 和紫毛兜兰 (*P. villosum*) 相似。与前者不同在于新杂种中萼片边缘不强烈后弯; 花瓣倒卵状匙形, 宽在2 cm以上; 退化雄蕊基部两侧不为强烈内卷。与后者不同在于中萼片上半部和边缘白色, 上面具1条宽阔的栗色中脉。

The new natural hybrid is similar to its parents *P. spicerianum* and *P. villosum*. It differs from the former by having a not strongly recurved-margined dorsal sepal, obovate-spatulate petals over 2 cm wide and a not involute-based staminode; and from the latter by its dorsal sepal white on the upper half and margins and with a broad maroon midrib adaxially.

叶4—5枚, 矩圆状椭圆形, 长16—23 cm, 宽3—4.5 cm, 上面绿色, 背面基部有紫红色斑点。花葶直立, 长19—20 cm, 疏被带褐色短柔毛; 苞片长4—4.5 cm, 绿色, 疏被带褐色短柔毛; 花梗与子房长3.8—4.2 cm, 疏被紫褐色短柔毛; 花单朵, 直径9—11 cm; 中萼片有1条宽阔的栗色中脉, 上半部及边缘白色, 下半部具紫红色脉纹和晕以及黄绿色的中央; 合萼片黄绿色; 花瓣中央有紫红色粗中脉, 中脉上侧紫褐色, 下侧黄绿色并有浅紫褐色晕; 唇瓣黄绿色, 有紫褐色晕和脉纹; 退化雄蕊紫褐色; 中萼片近圆形, 长、宽各5—5.2 cm, 下部边缘后弯, 背面密生白色短柔毛; 合萼片明显小于中萼片; 花瓣倒卵状匙形, 长5—5.3 cm, 宽2—2.2 cm, 边缘稍波状; 唇瓣盔状; 囊长2.8—3 cm, 宽1.8—2 cm, 囊口两侧耳状; 退化雄蕊倒卵状四方形, 长约1.2 cm, 宽1 cm, 中央有1个绿色的、不凸起的脐状物。

花期: 10月至翌年1月。

分布: 云南西部 (泸水县)。

生境: 疏林下多石之地; 海拔约2000 m。

亲本: 泸水兜兰 (杂种) *Paphiopedilum* × *lushuiense* 被视为白旗兜兰 (*P. spicerianum*) 和紫毛兜兰 (*P. villosum*) 之间的天然杂种。

Leaves 4–5, oblong-elliptic, 16–23 cm long, 3–4.5 cm wide, adaxially green, with purple-red spots toward abaxial base. Scape erect, 19–20 cm long, sparsely brownish-pubescent; bract 4–4.5 cm long, green, sparsely brownish-pubescent; pedicel and ovary 3.8–4.2 cm long, sparsely purplish-brown-pubescent; flower single, 9–11 cm across; dorsal sepal with a broad maroon midrib, white on the upper half and margins, veined and tinged with purple-red and with a yellow-green center on the lower half; synsepal yellow-green; petals

with a broad maroon midrib, on its upper side purple-brown and on its lower side yellow-green tinged with pale purple-brown; lip yellow-green tinged and veined with purple-brown; staminode purple-brown; dorsal sepal suborbicular, 5–5.2 cm long and wide, recurved on the lower margins, densely white-pubescent abaxially; synsepal conspicuously smaller than dorsal sepal; petals obovate-spatulate, 5–5.3 cm long, 2–2.2 cm wide, slightly undulate-margined; lip helmet-shaped; pouch 2.8–3 cm long, 1.8–2 cm wide, auriculate on both sides of its mouth; staminode obovate-square, ca. 1.2 cm long, 1 cm wide, with a green, not raised umbo centrally.

Flowering period: October to January.

Distribution: W Yunnan (Lushui county).

Habitat: In rocky place in open forest; alt. ca. 2000 m.

Parents: *Paphiopedilum* × *lushuiense* is considered to be a natural hybrid between *P. spicerianum* and *P. villosum*.



图 6-4. 泸水兜兰 (杂种)

Fig. 6-4. *Paphiopedilum* × *lushuiense* Z. J. Liu & S. C. Chen

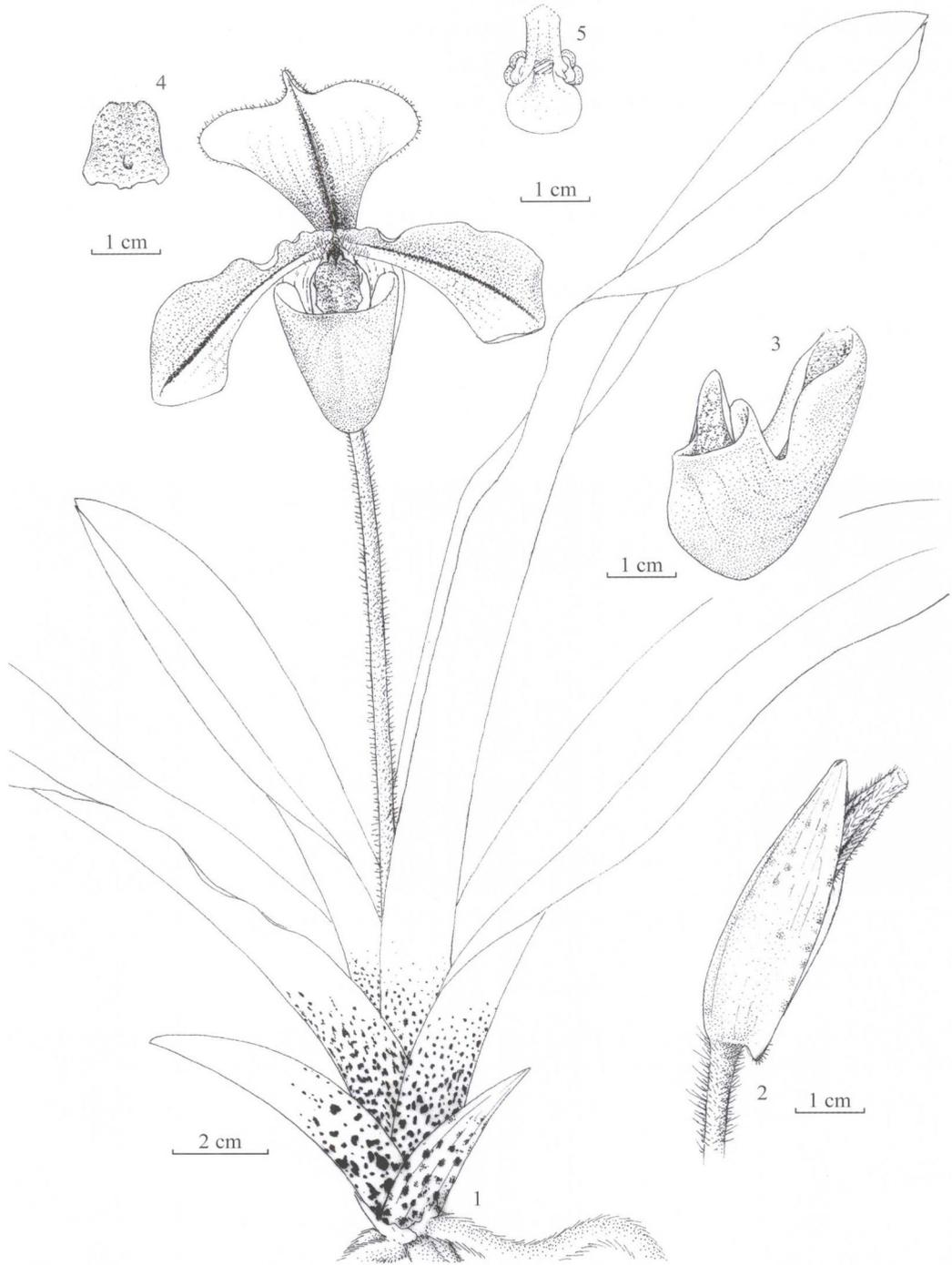


图 6-5. 泸水兜兰 (杂种): 1. 带花植株; 2. 苞片与子房; 3. 唇瓣, 侧面观; 4. 蕊柱, 正面观; 5. 退化雄蕊, 正面观

Fig. 6-5. *Paphiopedilum* × *lushuiense*: 1. Flowering plant; 2. Bract and ovary; 3. Lip, side view; 4. Column, front view; 5. Staminode, front view

5. 黄氏兜兰 (杂种) (图6-6) (Fig. 6-6)

Paphiopedilum* × *petchleungianum Gruss in Die Orchidee 52 (4): 398. 2001.

叶3—6枚, 矩圆状披针形, 长20—30 cm, 宽3—3.5 cm, 绿色, 背面近基部有紫色斑点。花葶长约20 cm, 绿色, 被短柔毛; 花序具1—2花; 苞片绿色; 花梗和子房明显长于苞片; 花直径8—10 cm; 中萼片近白色或浅黄色而具白色边缘, 有黄色或紫褐色条纹, 基部暗栗色; 合萼片近白色或浅黄色而具白色边缘; 花瓣具1条紫褐色中脉, 中脉上侧红褐色或紫褐色, 其下侧色较浅; 唇瓣红褐色或紫褐色, 有浅黄色晕; 退化雄蕊白色或浅黄色, 中央有绿色脉纹; 中萼片卵状椭圆形, 长约5.5 cm, 宽3.5 cm, 边缘向后弯; 合萼片与中萼片相似; 花瓣近匙形, 长达7.5 cm, 宽约2 cm, 边缘波状; 唇瓣盔状; 囊长约5 cm, 宽3 cm, 囊口两侧呈耳状; 退化雄蕊近倒卵状四方形, 长、宽各1.2—1.4 cm。

花期: 6—7月。

分布: 云南东南部 (文山地区)。

生境: 不详。

亲本: 黄氏兜兰 (杂种) *Paphiopedilum* × *petchleungianum* 被认为是长瓣兜兰 (*P. dianthum*) 与紫毛兜兰 (*P. villosum*) 之间的天然杂种。



图 6-6. 黄氏兜兰 (杂种)

Fig. 6-6. *Paphiopedilum* × *petchleungianum* Gruss

Leaves 3–6, oblong-lanceolate, 20–30 cm long, 3–3.5 cm wide, green, spotted with purple toward abaxial base. Scape ca. 20 cm long, green, pubescent; inflorescence with 1–2 flowers; bracts green; pedicel and ovary conspicuously longer than bracts; flowers 8–10 cm across; dorsal sepal whitish or pale yellow and white-margined, with yellow or purple-brown stripes and a dark maroon base; synsepal whitish or pale yellow and white-margined; petals with a purple-brown midrib, the upper side of the midrib red-brown or purple-brown, lower side paler in color; lip red-brown or purple-brown, tinged with pale yellow; staminode whitish or pale yellow, veined with green centrally; dorsal sepal ovate-elliptic, ca. 5.5 cm long, 3.5 cm wide, recurved-margined; synsepal similar to dorsal sepal;

petals subspatulate, to 7.5 cm long, ca. 2 cm wide, undulate-margined; lip helmet-shaped; pouch ca. 5 cm long, 3 cm wide, auriculate on both sides of its mouth; staminode somewhat obovate-square, 1.2–1.4 cm long and wide.

Flowering period: June and July.

Distribution: SE Yunnan (Wenshan district).

Habitat: Unknown.

Parents: *Paphiopedilum* × *petchleungianum* is considered to be a natural hybrid between *P. dianthum* and *P. villosum*.

6. 中华紫毛兜兰 (杂种) (图6-7, 8) (Fig. 6-7, 8)

Paphiopedilum × *sinovillosum* Z. J. Liu & S. C. Chen in J. South China Agric. Univ. 25 (4). 123. 2004.

叶4—5枚, 狭矩圆形, 长8—19 cm, 宽1.5—2 cm, 绿色, 背面基部有暗紫色晕。花葶近直立, 长18—22 cm, 被紫色短柔毛; 苞片长约4 cm, 近无毛; 花梗和子房长约4 cm; 花单朵, 直径约7.5 cm; 中萼片绿黄色, 具深栗色斑点; 合萼片上的斑点较少而且较小; 花瓣浅紫褐色, 有深紫褐色中脉; 唇瓣浅紫褐色; 退化雄蕊近黄色, 有浅紫褐色晕; 中萼片近圆形, 长4.6—4.8 cm, 宽4.2—4.3 cm, 边缘稍波状, 背面疏生紫色微柔毛; 合萼片卵形, 宽2—2.2 cm, 花瓣近匙形, 长5.2—5.4 cm, 宽1.8—2.1 cm; 唇瓣盔状; 囊长3.4—3.6 cm, 宽2.2—2.4 cm, 囊口两侧略呈耳状; 退化雄蕊宽矩圆状倒卵形, 长约1.2 cm, 宽1.1 cm, 中央具脐状突起。

花期: 9—10月。

分布: 云南东南部 (麻栗坡县)。

生境: 石灰岩地区岩隙中; 海拔约1500 m。

亲本: 中华紫毛兜兰 (杂种)

Paphiopedilum × *sinovillosum*被认为是亨利兜兰 (*P. henryanum*) 和紫毛兜兰 (*P. villosum*) 之间的天然杂种。它颇似维腾兜兰 (杂种) *Paphiopedilum* × *vietenryanum* Gruss & Petchl. (2002) (格力兜兰 *P. gratrixianum* 与亨利兜兰之间的天然杂种)。但维腾兜兰 (杂种) 的中萼片底色为白色, 显示它与格力兜兰 (*P. gratrixianum*) 的亲缘关系, 而本杂种中萼片的底色为黄绿色, 与紫毛兜兰中萼片的色泽相同。

Leaves 4–5, narrowly oblong, 8–19 cm long, 1.5–2 cm wide, green, tinged with dark purple toward abaxial base. Scape suberect, 18–22 cm long, purple-pubescent; bract ca. 4 cm long, subglabrous; pedicel and ovary ca. 4 cm long; flower single, ca. 7.5 cm across; dorsal sepal yellow-green spotted with deep maroon; synsepal with fewer and smaller spots; petals pale purple-brown, with a deep purple-brown midrib; lip pale purple-brown; staminode yellowish, tinged with pale purple-brown; dorsal sepal suborbicular, 4.6–4.8 cm long, 4.2–4.3 cm wide, slightly undulate-margined, purple-puberulous abaxially; synsepal ovate, 2–2.2 cm wide; petals subspatulate, 5.2–5.4 cm long, 1.8–2.1 cm wide; lip helmet-shaped; pouch 3.4–3.6 cm long, 2.2–2.4 cm wide, auriculate on both sides of its mouth; staminode



图 6-7. 中华紫毛兜兰
Fig. 6-7. *Paphiopedilum* × *sinovillosum*
Z. J. Liu et S. C. Chen

broadly oblong-ovate, ca. 1.2 cm long, 1.1 cm wide, with a central umbo.

Flowering period: September and October.

Distribution: SE Yunnan (Malipo county).

Habitat: In crevices of rocks in limestone area; alt. ca. 1500 m.

Parents: *Paphiopedilum* × *sinovillosum* is considered to be a natural hybrid of *P. henryanum* and *P. villosum*. It is rather similar to *Paphiopedilum* × *vietenryanum* Gruss & Petchl. (2002), a natural hybrid between *P. gratrixianum* and *P. henryanum*. However, the dorsal sepal of *P. × vietenryanum* has a white background, indicating its relation to *P. gratrixianum*, while that of *P. × sinovillosum* has a yellow-green background, the same color as found in *P. villosum*.

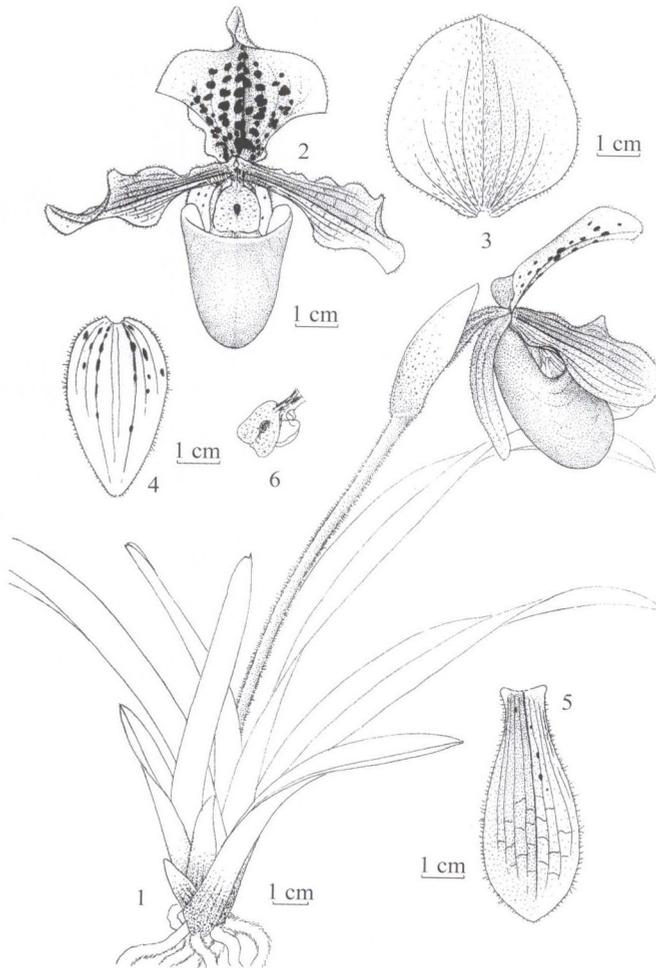


图 6-8. 中华紫毛兜兰 (杂种): 1. 带花植株; 2. 花; 3. 中萼片, 背面观; 4. 合萼片, 正面观; 5. 花瓣, 正面观; 6. 蕊柱, 侧面观

Fig. 6-8. *Paphiopedilum* × *sinovillosum*: 1. Flowering plant; 2. Flower; 3. Dorsal sepal, back view; 4. Synsepal, front view; 5. Petal, front view; 6. Column, side view

7. 波缘兜兰 (杂种) 新天然杂种 (图6-9, 10) (Fig. 6-9, 10)

Paphiopedilum* × *undulatum Z. J. Liu & S. C. Chen, hybr. nat. nov.

Type: China, Yunnan, Yingjiang county, Tongbiguan (铜壁关), in humus-rich place in forest in limestone area, alt. ca. 1300 m, 28 Dec. 2003, Z. J. Liu 2828 (holotype, NOCC!).

Hybrida naturalis nova ejus parentibus *Paphiopedilo areeano* et *P. spiceriano* similis, ex illo planta rhizomate elongato destituta, sepalis intermedio supra manifeste rubiginoso-costatis sed non brunneo-nervato, staminodio basi leviter involute utrinsecus, e hoc sepalis intermedio magis vix recurvo subter non rubiginoso-costatis, staminodio basi leviter involuto utrinsecus differt.

此新天然杂种近似其亲本根茎兜兰 (*P. areeanum*) 和白旗兜兰 (*P. spicerianum*)。与前者区别在于新杂种的植株不具延长的根状茎, 中萼片上表面具1条清晰的栗色中脉, 但无浅褐色脉; 退化雄蕊基部两侧稍微内卷。与后者区别在于中萼片边缘几乎不向后弯, 而且背面不具栗色中脉; 退化雄蕊基部两侧仅稍内卷。

The new natural hybrid is similar to its parents *P. areeanum* and *P. spicerianum*. It differs from the former by the plant lacking an elongate rhizome, its dorsal sepal with a broad maroon midrib but lacking pale brown nerves on adaxial surface, and staminode slightly involute on both basal sides; and from the latter by its dorsal sepal scarcely recurved-margined and lacking a maroon midrib abaxially, and staminode only slightly involute on both basal sides.

叶3—5枚, 狭矩圆状椭圆形, 长12—40 cm, 宽1.5—3.3 cm, 绿色, 背面近基部有紫褐色斑点。花葶直立, 长30—40 cm, 密被紫色短柔毛, 苞片长4.4—4.8 cm, 被白色短柔毛; 花梗和子房长5.5—5.9 cm, 密被紫色短柔毛; 花单朵, 直径7.5—8.5 cm; 中萼片白色, 基部有绿色或黄绿色晕, 有1条宽阔的栗色中脉; 合萼片绿色或黄绿色, 具褐色细斑点; 花瓣黄绿色, 有浅褐色晕和斑点; 唇瓣黄绿色, 具浅紫褐色晕、斑点和脉纹; 退化雄蕊浅黄色, 具浅紫褐色晕; 中萼片卵状圆形, 长5.4—5.8 cm, 宽4.6—5.3 cm, 两面被白色短柔毛; 合萼片卵形, 明显小于中萼片; 花瓣近矩圆形, 长5.5—6.1 cm, 宽1.3—1.6 cm, 边缘明显波状, 被白色微柔毛; 唇瓣盔状; 囊长3—3.5 cm, 宽2.6—2.8 cm, 囊口两侧稍呈耳状; 退化雄蕊近倒卵状四方形, 长1.3—1.5 cm, 宽1.5—1.7 cm, 中央具脐状突起。

花期: 10—12月。

分布: 云南西南部 (盈江县)。

生境: 石灰岩地区林下腐殖质丰富处; 海拔约1300 m。



图 6-9. 波缘兜兰 (杂种)
Fig. 6-9. *Paphiopedilum* × *undulatum*
Z. J. Liu & S. C. Chen

亲本：波缘兜兰（杂种）*Paphiopedilum* × *undulatum*被认为是根茎兜兰（*P. areeanum*）和白旗兜兰（*P. spicerianum*）之间的天然杂种。

Leaves 3–5, narrowly oblong-elliptic, 12–40 cm long, 1.5–3.3 cm wide, green, with purple-brown spots toward abaxial base. Scape erect, 30–40 cm long, densely purple-pubescent; bract 4.4–4.8 cm long, white-pubescent; pedicel and ovary 5.5–5.9 cm long, densely purple-pubescent; flower single, 7.5–8.5 cm across; dorsal sepal white tinged with green or yellow-green toward its base, with a broad deep maroon midrib; synsepal green or yellow-green, with small brown spots; petals yellow-green tinged and spotted with pale brown; lip yellow-green tinged, spotted and veined with pale purple-brown; staminode

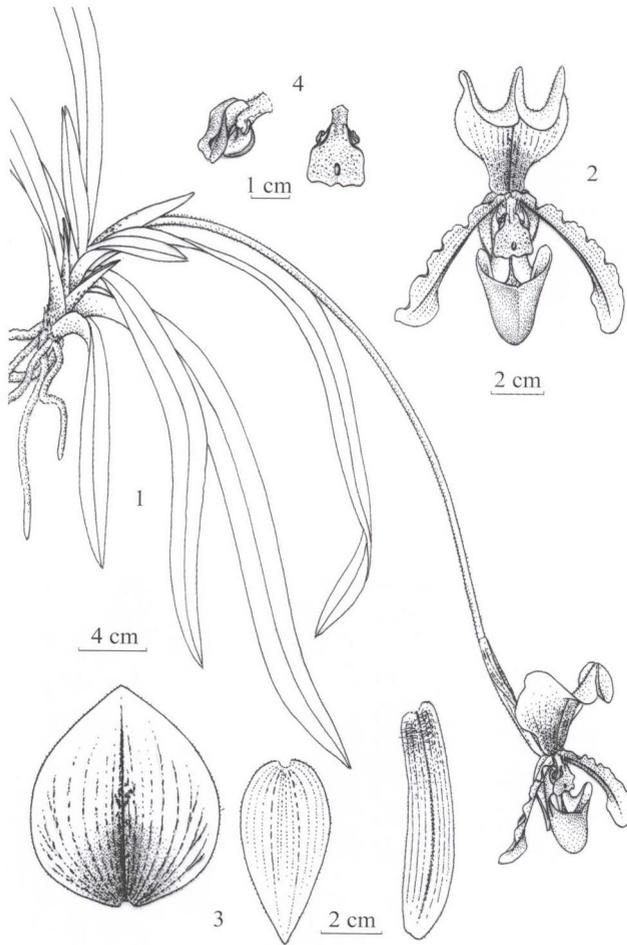


图 6-10. 波缘兜兰（杂种）：1. 带花植株；2. 花；3. 中萼片、合萼片与花瓣，正面观；4. 蕊柱，侧面观和正面观
Fig. 6-10. *Paphiopedilum* × *undulatum* Z. J. Liu & S. C. Chen: 1. Flowering plant; 2. Flower; 3. Dorsal sepal, synsepal, petal, front view; 4. Column, side view and front view

pale yellow tinged with pale purple-brown; dorsal sepal ovate-orbicular, 5.4–5.8 cm long, 4.6–5.3 cm wide, white-pubescent on both surfaces; synsepal ovate, conspicuously smaller than dorsal sepal; petals suboblong, 5.5–6.1 cm long, 1.3–1.6 cm wide, conspicuously undulate-margined, white-puberulous; lip helmet-shaped; pouch 3–3.5 cm long, 2.6–2.8 cm wide, slightly auriculate on both sides of its mouth; staminode somewhat obovate-square, 1.3–1.5 cm long, 1.5–1.7 cm wide, with a central umbo.

Flowering period: October to December.

Distribution: SW Yunnan (Yingjiang county).

Habitat: In humus-rich place in forest in limestone area; alt. ca. 1300 m.

Parents: *Paphiopedilum* × *undulatum* is considered to be a natural hybrid between *P. areeanum* and *P. spicerianum*.

8. 维腾兜兰 (杂种) (图6-11) (Fig. 6-11)

Paphiopedilum × vietenryanum Gruss & Petchl. in Die Orchidee 53 (2): 221. 2002.

叶数枚，狭矩圆形，绿色，背面近基部常有紫斑。花葶近直立；长15—20 cm；苞片长4—5 cm；花梗和子房略短于苞片；花单朵；中萼片白色，有浅紫色晕和暗栗色斑点；合萼片浅褐色；花瓣紫褐色；唇瓣浅紫褐色，有模糊的深色脉纹；退化雄蕊浅褐色；中萼片近圆形，长、宽各4—5 cm；合萼片明显小于中萼片；花瓣近匙形，长5—5.5 cm，宽约2 cm，边缘波状；唇瓣盔状；囊长约3.5 cm，宽2.3 cm，囊口两侧略呈耳状；退化雄蕊宽倒卵状椭圆形，长、宽各约1.1—1.2 cm，中央具脐状突起。

花期：7月。

分布：云南东南部（文山地区）。

生境：不详。

亲本：维腾兜兰（杂种）*Paphiopedilum × vietenryanum*被认为是格力兜兰（*P. gratrixianum*）与亨利兜兰（*P. henryanum*）之间的天然杂种。

Leaves several, narrowly oblong, green, often marked with purple toward abaxial base. Scape suberect, 15–20 cm long; bract 4–5 cm long; pedicel and ovary slightly shorter than bract; flower single; dorsal sepal white, tinged with pale purple and spotted with dark maroon; synsepal pale brown; petals purple-brown; lip pale purple-brown, obscurely with deeper veins; staminode pale brown; dorsal sepal suborbicular, 4–5 cm long and wide; synsepal conspicuously smaller than dorsal sepal; petals subspatulate, 5–5.5 cm long, ca. 2 cm wide, undulate-margined; lip helmet-shaped; pouch ca. 3.5 cm long, 2.3 cm wide, slightly auriculate on both sides of its mouth; staminode broad obovate-elliptic, 1.1–1.2 cm long and wide, with a central umbo.

Flowering period: July.

Distribution: SE Yunnan (Wenshan district).

Habitat: Unknown.

Parents: *Paphiopedilum × vietenryanum* is considered to be a natural hybrid between *P. gratrixianum* and *P. henryanum*.



图 6-11. 维腾兜兰(杂种)

Fig. 6-11. *Paphiopedilum × vietenryanum* Gruss & Petchl.

9. 盈江兜兰 (杂种) (图6-12, 13) (Fig. 6-12, 13)

Paphiopedilum × yingjiangense Z. J. Liu & S. C. Chen in Acta Bot. Yunnan. 29 (3): 289. 2007.

叶3—7枚, 长15—23 cm, 宽3.5—4.5 cm, 上面有模糊的深浅绿色相间的网格斑, 背面有模糊的浅紫色斑并在基部具紫色斑点。花葶长25—30 cm, 密被紫毛; 苞片长2—3 cm, 绿色, 背面被细毛; 花梗与子房绿色, 长5.5—5.8 cm, 被短柔毛; 花单朵, 直径9.5—10.5 cm, 黄绿色而有浅褐色晕和褐色脉纹; 中萼片上有1条宽阔的栗色中脉; 合萼片上有绿色脉; 花瓣上亦有1条栗色中脉; 退化雄蕊中央绿色, 有深绿色脉纹; 中萼片宽卵形, 长5.3—5.8 cm, 宽4—4.7 cm, 背面被短柔毛; 合萼片小于中萼片; 花瓣近矩圆形, 长4.5—6.2 cm, 宽1.8—2.1 cm, 下半部边缘波状, 边缘有紫缘毛; 唇瓣盔状, 内弯的侧裂片上具斑点; 囊长2.5—3 cm, 宽2—2.5 cm, 囊口两侧呈耳状; 退化雄蕊近方形, 长、宽各1.3—1.5 cm, 中央有绿色脉纹。

花期: 2—4月。

分布: 云南西南部(盈江县)。

生境: 生于林下岩石上; 海拔约1700 m。

亲本: 此种植物曾一度被认为是紫毛兜兰 (*P. villosum*) 和彩云兜兰 (*P. wardii*) 之间的天然杂种, 但现在我们相信它是白旗兜兰 (*P. spicerianum*) 与彩云兜兰之间的天然杂种, 这是根据它的花瓣具波状边缘和中萼片上有宽阔的栗色中脉做出的判断。



图 6-12. 盈江兜兰 (杂种)
Fig. 6-12. *Paphiopedilum × yingjiangense*
Z. J. Liu & S. C. Chen

Leaves 3—7, 15—23 cm long, 3.5—4.5 cm wide, adaxially obscure-tessellated with deep and light green, abaxially obscurely marked with pale purple and basally with purple spots. Scape 25—30 cm long, densely purple-hairy; bract 2—3 cm long, green, abaxially minutely hairy; pedicel and ovary green, 5.5—5.8 cm long, pubescent; flower single, 9.5—10.5 cm across, yellow-green tinged with pale brown and veined with brown; dorsal sepal with a broad maroon midrib; synsepal green-veined; petals with a maroon midrib; staminode green and veined with deep green centrally; dorsal sepal broadly ovate, 5.3—5.8 cm long, 4—4.7 cm wide, pubescent abaxially; synsepal smaller than dorsal sepal; petals suboblong, 4.5—6.2 cm long, 1.8—2.1 cm wide, basal half undulate-margined, purple-ciliate; lip helmet-shaped, with spots on its incurved side-lobes; pouch 2.5—3 cm long, 2—2.5 cm wide, auriculate on both sides of its mouth; staminode subsquare, 1.3—1.5 cm long and wide, with green veins centrally.

Flowering period: February to April.

Distribution: SW Yunnan (Yingjiang county).

Habitat: On rocks in forests; alt. ca. 1700 m.

Parents: This entity was once considered to be a natural hybrid of *P. villosum* and *P. wardii*, but now we believe that it is a natural hybrid of *P. spicerianum* and *P. wardii* based on its undulate-margined petals and that there is a broad maroon midvein on dorsal sepal.

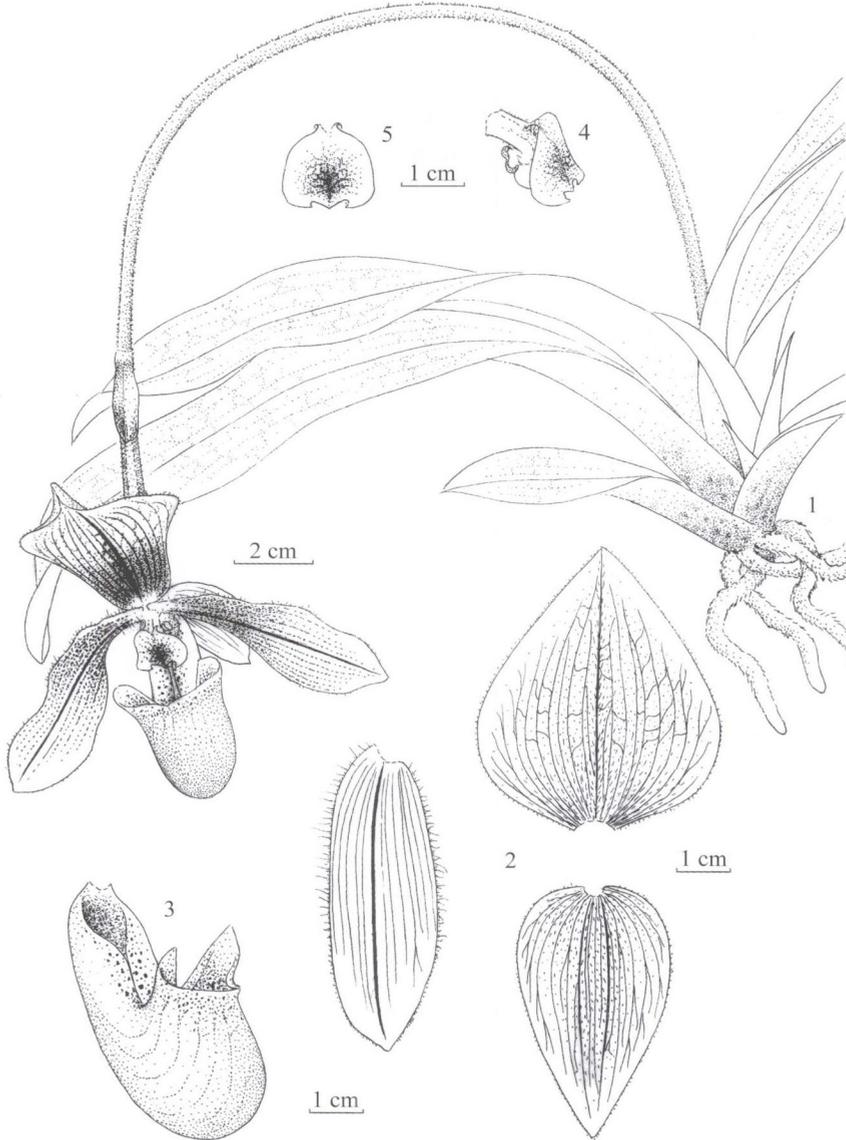


图 6-13. 盈江兜兰 (杂种): 1. 带花植株; 2. 中萼片、花瓣与合萼片, 背面观; 3. 唇瓣, 侧面观; 4. 蕊柱; 5. 退化雄蕊

Fig. 6-13. *Paphiopedilum* × *yingjiangense*: 1. Flowering plant; 2. Dorsal sepal, petal and synsepal, back view; 3. Lip, side view; 4. Column; 5. Staminode

10. 云南兜兰 (杂种) 新天然杂种 (图6-14, 15) (Fig. 6-14, 15)

Paphiopedilum × **yunnanicum** Z. J. Liu & S. C. Chen, hybr. nat. nov.**Type:** China, Yunnan, Malipo county, 5 Nov. 2002, Z. J. Liu 2605 (holotype, NOCC!).

Hybrida naturalis nova ejus parentibus *Paphiopedilo appletoniano* et *P. villosu* var. *densissimo* similis, ex illo foliis supra solum obscure-tessellatis, petalis plus quam 2 cm latis non atrobrunneo-verrucatis, staminodio subcuspidato ad apicem, e hoc foliis supra leviter profunde et pallide viridi-tessellatis, pilis pedunculi ovariisque brevioribus, staminodio viridi-nervato ad centrum differt.

此新天然杂种与其亲本卷萼兜兰 (*P. appletonianum*) 和密毛兜兰 (变种) (*P. villosu* var. *densissimum*) 相似。与前者区别在于新杂种叶上面仅有模糊的网格斑; 花瓣宽在2 cm以上且不具黑褐色疣状突起; 退化雄蕊先端近骤尖。与后者区别在于叶上面稍有深浅绿色相间的网格斑; 花序柄和子房的毛较短; 退化雄蕊中央有绿色脉纹。

This new natural hybrid is similar to its parents *Paphiopedilum appletonianum* and *P. villosu* var. *densissimum*. It differs from the former by its leaves only obscurely tessellated adaxially, petals over 2 cm wide and lacking black-brown warts, and staminode subcuspidate apically; and from the latter by its leaves slightly tessellated with deep and light green adaxially, peduncle and ovary with shorter hairs, and staminode green-veined centrally.

叶4—5枚, 狭矩圆形, 长5—25 cm, 宽1.7—2.6 cm, 上面仅稍有深浅绿色相间的网格斑, 背面基部有紫晕。花葶直立, 长约36 cm, 被白色柔毛; 苞片宽卵状披针形, 长2.6—3 cm; 花梗和子房长3.5—4.5 cm, 被白色柔毛; 花通常单朵, 直径约9 cm; 中萼片紫褐色, 上部边缘近白色或绿白色, 具深色脉; 合萼片绿白色, 具绿色脉; 花瓣紫褐色, 有不规则白色晕, 中脉下侧色泽较浅并常有绿色晕; 唇瓣紫褐色, 有模糊的深色脉纹; 退化雄蕊浅褐色, 中央有绿色脉纹; 中萼片椭圆形, 长4.3—4.7 cm, 宽2—2.3 cm, 背面具白毛; 合萼片稍小于中萼片; 花瓣匙形, 长5.5—6 cm, 宽2.1—2.4 cm, 下半部边缘波状; 唇瓣盔状, 内折侧裂片上有斑点; 囊长2.9—3.2 cm, 宽1.9—2.2 cm, 囊口两侧呈耳状; 退化雄蕊近方形, 长9—10 mm, 宽10—12 mm, 先端近骤尖, 中央有脐状突起。

花期: 2至4月。

分布: 云南东南部 (麻栗坡县)。

生境: 石灰岩林下腐殖土丰富处; 海拔1500 m。

亲本: 云南兜兰 (杂种) *Paphiopedilum* × *yunnanicum* 被认为是卷萼兜兰 (*P. appletonianum*) 与密毛兜兰 (变种) *P. villosu* var. *densissimum*之间的天然杂种。

Leaves 4–5, narrowly oblong, 5–25 cm long, 1.7–2.6 cm wide, adaxially only slightly tessellated with deep and light green, tinged with purple toward abaxial base. Scape erect, ca. 36 cm long, covered with white soft hairs; bract broadly ovate-lanceolate, 2.6–3 cm long;

pedicel and ovary 3.5–4.5 cm long, covered with white soft hairs; flower often single, ca. 9 cm across; dorsal sepal purple-brown, upper margins whitish or green-white, with deeper veins; synsepal green-white, with green veins; petals purple-brown, irregularly tinged with whitish, lower side of the midrib paler in color and often tinged with green; lip purple-brown, obscurely with deeper veins; staminode pale brown, green-veined centrally; dorsal sepal elliptic, 4.3–4.7 cm long, 2–2.3 cm wide, white-hairy abaxially; synsepal slightly smaller than dorsal sepal; petals spatulate, 5.5–6 cm long, 2.1–2.4 cm wide, undulate-margined on the basal half; lip helmet-shaped, spotted on its incurved side-lobes; pouch 2.9–3.2 cm long, 1.9–2.2 cm wide, auriculate on both sides of its mouth; staminode somewhat square, 9–10 mm long, 10–12 mm wide, subcuspidate apically, with a central umbo.

Flowering period: February to April.

Distribution: SE Yunnan (Malipo county).

Habitat: In humus-rich place in forest in limestone area; alt. ca. 1500 m.

Parents: *Paphiopedilum* × *yunnanicum* is considered to be a natural hybrid between *P. appletonianum* and *P. villosum* var. *densissimum*.



图 6-14. 云南兜兰 (杂种)

Fig. 6-14. *Paphiopedilum* × *yunnanicum* Z. J. Liu & S. C. Chen

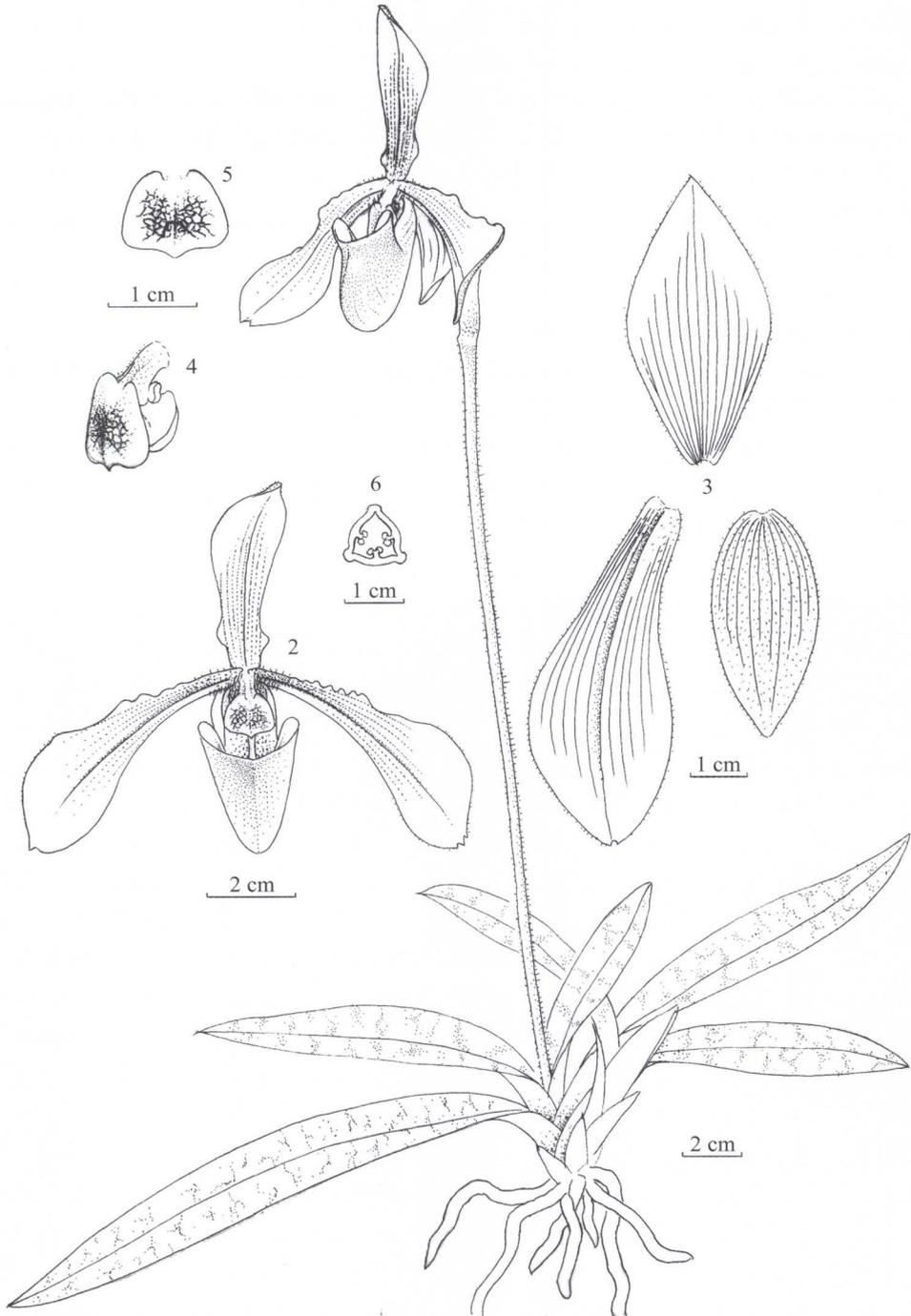


图 6-15 云南兜兰 (杂种): 1. 带花植株; 2. 花; 3. 中萼片、花瓣与合萼片; 4. 蕊柱; 5. 退化雄蕊; 6. 子房横切面

Fig. 6-15. *Paphiopedilum* × *yunnanicum*: 1. Flowering plant; 2. Flower; 3. Dorsal sepal, petal and synsepal; 4. Column; 5. Staminode; 6. Ovary cross section

三、人工杂种 Artificial hybrids

兜兰属的人工杂交育种始于19世纪60年代。最早的人工杂种*Paphiopedilum Harrisianum*是1869年登录的。此人工杂种由英国Veitch兄弟苗圃培育并开花，其亲本为髯毛兜兰 (*P. barbatum*) 与紫毛兜兰 (*P. villosum*)。第二个人工杂种也是在该苗圃培育的，称为*Paphiopedilum Vexillarium*，于1870年登录，其亲本为费氏兜兰 (*P. fairrieianum*) 与髯毛兜兰。

从此时开始，凡是有效发表的兰花新杂种，均同时被认为是已经正式登录的。有效发表需要按《国际栽培植物命名法规》的规定，予以正确命名与发表。有效发表的最早文献应是1858年的《园丁年鉴》*Gardeners' Chronicle*的第4页。兰科植物，包括兜兰属植物的人工杂种，全部被收入国际上《散氏兰花杂种完全名录》*Sander's Complete List of Orchid Hybrids*之中。此书第一本出版于1946年，凡是1945年12月31日以前发表和登录的兰科人工杂种均被收录在内。据计算当时收录的兜兰人工杂种达750种，涉及亲本41个野生种。《散氏兰花杂种完全名录》出版后到1960年，又出版了增补 I 与增补 II，并改名为《散氏兰花杂种一览表》*Sander's One-Table List of Orchid Hybrids*。然后从1961年开始，每5年出一本。

由于市场的需要，兜兰的人工杂种增加得很快。《散氏兰花杂种一览表》收录的种类，在1970年增加了67种；1971—1980年的登录数超过了200种。今天，兜兰人工杂种的数字已超过10 000个。

人工杂种中有不少是园艺家培育的精品，在兰花市场热销百余年而不衰。例如，1884年登录的*Paphiopedilum Leeanum*是由波瓣兜兰 (*P. insigne*) 与白旗兜兰 (*P. spicerianum*) 杂交而育成的，花朵硕大美观，易于栽培，至今仍甚受欢迎。由此杂种与白旗兜兰再杂交育成的*Paphiopedilum Bruno*花径达10 cm，自1896年登录以来，历时百余年，销售市场仍继续看好。又如，1897年登录的多花类型*Paphiopedilum Lady Isabel*，1900年登录的*Paphiopedilum Maudiae*，1973年登录的紫褐花类型*Paphiopedilum Song-Bird*，1977年登录的黄绿花类型*Paphiopedilum Jolly Green*等。其中*Paphiopedilum Maudiae*是由劳氏兜兰 (*P. lawrenceanum*) × 胼胝兜兰 (*P. callosum*) 育成的，有紫花至绿白花等一系列类型。例如，*Paphiopedilum Maudiae* 'Magnificum' 为绿白花系列，*Paphiopedilum Maudiae* 'Red Swan' 为紫红花系列等，在市场上甚受欢迎，经久不衰。

近二十多年来，发现于中国西南部与越南北部的许多兜兰属新种，为兜兰园艺育种注入了重要的新鲜血液，如杏黄兜兰 (*P. armeniacum*)、硬叶兜兰、麻栗坡兜兰、白花兜兰、汉氏兜兰 (*P. hangianum*)、越南兜兰 (*P. vietnamense*) 等。以它们为亲本进行杂交已培育出大量的名品，如*Paphiopedilum Fumi's Delight* (*P. armeniacum* × *P. micranthum*)、*Paphiopedilum Norito Hasegawa* (*P. armeniacum* × *P. malipoense*)、*Paphiopedilum Joyce Hasegawa* (*P. emersonii* × *P. delenatii*)、*Paphiopedilum Armeni*

White (*P. delenatii* × *P. armeniacum*)、*Paphiopedilum* Lola Bird (*P. micranthum* × *P. emersonii*) 等,受到广大兜兰爱好者热烈欢迎,在兰展中获得了大量的奖赏。

诚然,兜兰属的人工杂种是兰花产业中的重要支柱,蕴藏着很大的商机。但在我国,此项育种工作只在台湾有很大的发展,而在大陆尚处于起步阶段,只有少数企业和研究单位进行一些零星的杂交工作,远未进入商业化生产,这是需要引起高度重视的。下面为亲本见于中国的一些兜兰人工杂种(图6-16)(Fig. 6-16),供参考。



Paphiopedilum Norito Hasegawa 'Fong Yuan'
(*Paph. malipoense* × *Paph. armeniacum*)



Paphiopedilum Magic Lantern 'Ralph'
(*Paph. micranthum* × *Paph. delenatii*)



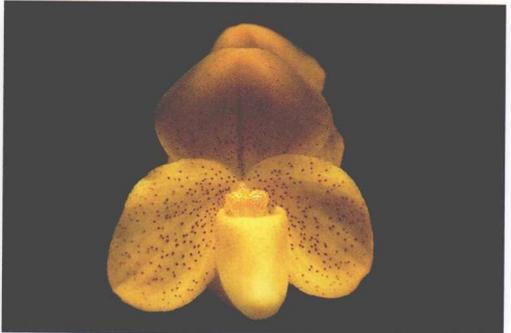
Paphiopedilum Ma Belle 'Dou Fang'
(*Paph. malipoense* × *Paph. bellatulum*)



Paphiopedilum Joyce Hasegawa 'Ruey-Hwa'
(*Paph. delenatii* × *Paph. emersonii*)



Paphiopedilum Wellesleyanum 'Mei Chen'
(*Paph. malipoense* × *Paph. wenshanense*)



Paphiopedilum Wellesleyanum 'Shin-Yi'
(*Paph. wenshanense* × *Paph. concolor*)

图 6-16. 亲本产于中国的一些人工杂种

Fig. 6-16. Some artificial hybrids with their parents found in China

第七章 栽培方法

CULTIVATION

兜兰属植物主要产于热带与亚热带南缘，大多数生于疏林下或林缘多石、透光、腐殖质丰富之地，也见于岩壁上或树上，亦即有散光而又排水良好的环境。自然生境对于园艺栽培是有重要参考意义的。当然，兜兰属种类繁多，各自对生境的要求也有明显的差异。有些种类生于次生林下微酸的基质上；有些则喜生于石灰岩山地微碱的坡地上。有些种类需要强光，如菲律宾兜兰（*P. philippinense*）；有些种类则需要相当的遮荫，如青紫兜兰（*P. violascens*）和布玲兜兰（*P. bullenianum*）；有些种类则既可在阳光直射下生长，也可在浓荫下生长，如杏黄兜兰，在0%—90%的郁闭度下均能生长良好。因此，必须根据具体的情况，制定合理、有效的管理方法。

一、光照 Light

兜兰属植物对光照的要求因种而异，不尽相同。但大多数种类都需要适量的光照和一定的遮荫。例如，在热带地区，许多兜兰种类喜生东坡或西坡，而在北半球亚热带南缘地区，一些耐阴的种类则多长在北坡、东北坡与西北坡，如硬叶兜兰、麻栗坡兜兰和长瓣兜兰等。当然，坡向还要受到遮荫度（郁闭度）和海拔高度的制约。

一般说来，大多数兜兰属植物所需的光照在10000—25000 lx（或1000—2500 footcandles, 1 footcandle=10.764 lx）之间。有经验的兰花栽培者都认为，兜兰属植物所需的光照大致与卡特兰属（*Cattleya*）植物相近。观察表明，若光照太弱或过分荫蔽，则兜兰叶片会变为暗绿色或暗蓝色，脆弱而且容易破裂；花葶变短，花朵难以开放。若光照太强，则叶片会失去光泽，斑纹也不那么美观；花葶会变长，花朵增多，在花开放后，色泽会变得更接近土黄色，而且失去原有的光泽。但抗病害的能力增强了。

实际上，在园艺栽培中绝大多数兜兰属植物均能适应不同的光照条件。不少兜兰栽培者认为，适当增加光照是明智之举，因为对于兜兰的生长和提高抗病害能力都会有明显的好处。G. Braem等（1998—1999）曾对不同种类的兜兰所需的光照提出比较具体的建议。对一些种类，如雪白兜兰（*P. niveum*）、菲律宾兜兰、然氏兜兰（*P. randsii*）、南印兜兰（*P. druryi*）等所需光照上限的建议甚至达到35 000 lx。但究竟何种光照合理，尚需要栽培者根据具体情况加以判断。

当然，在商业生产中要根据市场对产品的需求加以调节。例如，观叶的品种需要较多的荫蔽，而观花的品种则需要较多的光照。有些栽培者在生产中先给植株以较多光照，待花葶抽出以后再置于遮荫的环境中，使叶片变为深绿可爱，花葶又不太长，

花色也更加美观。但是，究竟需要多强的光照，多长时间的强光照，随后遮荫到什么程度，都需要栽培细心的观察和研究，方能得出正确的结论。因为不同的种类、品种，不同的环境和栽培条件，对光照的要求都不会是相同的。

二、温度 Temperature

兜兰属植物虽然产于热带与亚热带南缘地区，但大多生于空气流通而又有适当遮荫的环境中，因而性喜凉爽，太高太低的温度均不利于它们的生长。

在热带地区，季节温差和昼夜温差均较小。例如，产于加里曼丹岛赤道附近的曲蕊兜兰 (*P. supardii*)，当地月平均温度最高为3月，达到28.3℃，而月平均温度最低为2月，降至18.2℃，相差约10℃，而昼夜温差为6—9℃。而产于中国亚热带保山地区2000 m山地的杏黄兜兰，当地月平均最高温度为6月，达24℃，而月平均温度最低在1月，为0℃，相差24℃，昼夜温度亦在12℃以上。因此，原产于热带地区的兜兰，对于高温或低温，特别是温度的骤升剧降的反应都比较敏感；反之，亚热带或热带山地的种类，则较能忍受高温或低温的不利影响。一般认为，兜兰属植物的最适温度为15—28℃，最高温度不得超过32—36℃，不同的种类能适应的温度上限是不尽相同的。

热带种类对于低温难以忍受，但某些亚热带种类却能忍受短暂的3—5℃的低温，因为在云南西部和贵州，冬季的温度也会偶尔降至0℃，并未威胁到它们的生存。但无论如何，酷暑和严寒均不利于兜兰的生长，尤以大多数的热带种类为甚，故应力求避免。

在温室栽培中特别值得注意的是：夏季午间高温和冬季夜间高温是一切兰花生长的禁忌，兜兰属植物也绝不例外，故要严加防范。此外，闷热与湿冷，对于兜兰的生长也是极为有害的。

温度的调节除动用能源加温或降温外，应更多地采用遮光、通风、棚顶洒水、水帘等方法降温。切忌在夏季中午高温时在棚内喷洒冷水，以免造成高温高湿环境，引起真菌滋生、繁衍与蔓延。

三、浇水 Watering

水分的调节对于任何兰科植物的生长都是十分重要的。从所有兜兰属植物的原有生境看，几乎全部都生长在经常有水分供应，而又不滞留水分的地方。而附生于树上的种类较之生于地上或石上的种类，对水分的要求更为严格，保持水分的能力也更强。例如，附生于树上的兜兰，如飘带兜兰 (*P. parishii*)，是在夜间开启气孔和吸收二氧化碳的，到了白昼，气孔就关闭了，再释放出二氧化碳用于光合作用。这

种代谢称为景天酸代谢（CAM）。其好处是白昼不开启气孔，可以减少水分的损失。而地生种类则是在白昼开启气孔以吸收二氧化碳，保水的功能不如前者。但两者都喜润而怕湿，都生长在排水良好的环境中。

浇灌中的首要问题是水质。水质的好坏首先取决于水中盐分的浓度，盐分的含量越低，水质越好，因为盐分高会在栽培基质中不断积累，进而危害兰花植株的根部。所以浇灌时，首先要选择高质量水，如雨水、去离子水等。其次，在浇灌时要采用“连续两次浇水法”：第一次浇水用来溶解基质中盐分；第二次浇水是在大约30—40 min以后进行，用来冲洗基质中的盐分。

当然，浇水的主要目的是供应兰花植株新陈代谢的需要。但究竟要多少天浇一次，看法并不一致，不同的种类和在不同的条件下也未必雷同。一般认为每7天或4—10天浇一次水。《台湾仙履兰专辑Ⅲ》中曾报道说，在4—10天和10—20天浇水一次的对比中发现，前者比后者更有利于兜兰花苞的发育和减少消蕾现象的发生。

通常认为，热带附生兰在生长季节的晴天高温天气，要比亚热带地生兰在休眠季节的阴雨低温天气，需要更多的浇水。每次浇水必须浇透，使基质充分吸水，在排水后能较长时间保持润而不湿为佳。这显然与基质自身的保湿性能有关，与周围空气的湿度和通风情况也有关系。

水分过多对兜兰的生长也同样有害处，会引起叶子变黄。除光照过多会产生这种现象外，很少会因为缺氮而引起叶子变黄，因为兜兰并不需要过多的肥料。

浇水的时间最好选在早上温度微升时，特别在冬季应选在晴天上午，以使水温与室温大致相近，另一个好处就是可使植株在黄昏以前晾干，叶面不留水分过夜。如果基质过于干燥，应连续多次浇水，使基质湿润为度。要注意新基质排水通风好，宜勤浇水，而老基质则应适量减少浇水；在光线强时不可向叶面喷雾，因为水滴会折射和加强光线，从而会对叶组织造成损伤；幼苗和小苗忌干燥，宜勤浇水。

温室内的湿度一般要保持在70%—80%，冬季可以降为60%。增加湿度的方法主要是向地面洒水或向空气喷冷蒸汽，而湿度过高时，则用通风来调节。

四、通风 Ventilation

通风是种植一切兰科植物的最重要条件之一。兜兰属植物也不例外，因为在野外，不论是地生还是附生的种类，大都生于通风良好的自然环境中。它们通过气孔作为通道，直接吸收空气中所含的二氧化碳和其他游离的成分，供自身新陈代谢之用。因此，更换新鲜空气，使之不断流动，对于兰花植株的生长是十分必要的。其次，通风还可以调节温度和湿度，抑制病虫害的滋生和蔓延，同时也可以排除污浊有害的气体和灰尘等，以免堵塞气孔和伤害植物。

室内通风主要靠排风扇，辅以开窗通气。排风扇的数量和功率根据温室的大小而定，一般安装在兰花植株上方或紧靠顶棚，也可以靠近地面，以避免排风扇对兰花植

株猛吹，影响其生长。通风时间的长短，要根据棚内的温度与湿度的变化予以调节。调节通风要和缓，力求避免温度与湿度的剧升骤降。

除大环境的通风外，小环境的通风也至关重要。这主要指兰盆的通气、基质的通气和兰花植株之间的通气。也就是说要注意选用有底孔与边孔的兰盆和透气性和吸水性好的基质，以及讲究合理的布局和兰花植株之间的距离等，使通风不仅惠及所有的兰花植株，也惠及每一个兰花植株的根部。

五、基质 Culture media

在自然界，几乎所有兜兰属植物都生于多石、富含腐殖质的地表或岩缝中、树杈上，亦即排水良好并有适当养分可供吸收的环境中。因此，种植兜兰的基质要求：①吸湿、易干、透气；②不易腐烂；③不重或不太重；④有一定的硬度，用以支持与固定植株；⑤价格低廉。

兜兰所用的基质种类与其他兰科植物也大同小异，如水苔、紫萁根、树皮、木屑、稻壳、腐殖质、椰壳、棕榈纤维、泥炭土、塘泥球、碎骨、陶粒、砂砾、珍珠石、蛭石、塑料碎片（如聚苯乙烯）等。配制时种类不必齐全，多为就地取材，混合配制。

在基质配制之前要进行加工与消毒。凡是有机物，除水苔外都要切碎，加水和匀，晒干后再分割成直径1—2 cm 小块；无机物也同样要加工成大小规格不同的小块。

无机物一般不用消毒，洗净后在阳光直射下晒干即可备用，而有机物由于大多含有草籽、虫卵、真菌孢子等，故需要认真消毒。

最常用的消毒方法是用福尔马林（40%甲醛）的50倍液喷洒，每立方米用400 ml。喷洒后密闭放置2周，启封后10—20天即可使用。其次是用蒸汽消毒，任何装置都可以，只要让蒸汽通过基质1h即可达到杀菌灭虫的目的。此外，用溴化甲烷（ CH_3Br ）密闭消毒24 h或在低温冰箱中零下20℃冰冻24—48 h，也可达到消毒的目的。但一般种植场未必有此类设备，故较少使用。

基质颗粒的大小，可以根据所种植兜兰的种类予以调整。通常附生于树上的种类和原产热带的种类，基质颗粒要大些，无机基质的比例也要大一些，而地生种类和原产亚热带的种类则基质颗粒可以小些，无机基质的比例也可以小一些。一般要求在盆底与下部多用直径较大的基质与无机的基质，从下向上逐渐增加颗粒小的和有机的基质。为了防止蛞蝓和蜗牛等从底孔和边孔进入盆中，可用大颗粒的无机基质堵塞。

基质的酸碱度也应注意调节。大多数兜兰属植物生长于微酸的地表，故基质的酸碱度大多以5.5—6.5为宜。但也有不少种类生于石灰岩地区微碱的基质上，有些甚至要求强酸性的基质，所以要根据具体情况予以调节。若要加强酸性，可以加柠檬酸，也可用磷酸或盐酸，在水中稀释后，用以浇淋基质；若提升碱性，则可以将氩

氧化钾溶于水用来浇淋基质或把破碎的牡蛎壳加入基质中。

六、肥料 Fertilizers

养分是任何植物生长所必需的，兜兰属植物也不例外，除了可以直接从空气中吸收游离养分以外，也需要供给和补充其他必要的养分，尤其是在商业栽培中。施肥是供应植物养分的重要手段。对于大多数植物来说，最重要的肥料应是氮（N）、磷（P）、钾（K）。氮是氨基酸、蛋白质、叶绿素和多种酶的组成元素之一；磷是核酸、磷脂，也是多种酶的组成元素之一；钾为某些酶的活化剂，参与细胞原生质的多种活动，促进蛋白质的代谢。除此而外，微量元素也是植物生长所不可或缺的，如钙（Ca）、镁（Mg）、硫（S）、铁（Fe）、硼（B）、铜（Cu）、锌（Zn）、锰（Mn）、钼（Mo）、氯（Cl）等。还有一些生长激素和维生素之类，也可以列入肥料范围内。从大多数兰科植物看，在幼苗时期需要较多氮肥，一般氮、磷、钾的比例为3:1:1，到了成苗时期三者的比例相近，而在花期则磷肥要成倍增加。

肥料可以分为有机肥与无机肥两类。有机肥包括禽畜粪、血粉、饼粕、腐殖质等。其中鸡粪含氮与磷最高，可分别达到30%与14%，马粪次之，含氮为15%，但含钾高达13%，猪粪所含氮、磷、钾分别为13%、7%、11%，牛粪含量最低，分别为10%、3%、8%。有机肥必须经过2—3个月以上的时间充分发酵后，方可兑水稀释使用。无机肥指化学肥料。氮肥主要有硫酸铵、硝酸铵、碳酸氢铵、氯化铵、尿素等；磷肥主要有磷酸钙、磷酸铵、磷酸二氢钾等；钾肥主要有氯化钾、硫酸钾等。化学肥料所含的元素常为多种而且交叉，要精密计算，混合使用。但市场上的兰肥或花肥大多为完全性肥料，主要元素和微量元素一应俱全，对于规模不大或家庭种植者用起来十分方便。

种植兜兰是不需要太多肥料的，较之其他兰科植物要少得多，特别是厚叶的种类，如同色兜兰、巨瓣兜兰等，很容易由于施肥不慎而受害。它们只能每4—6个月施用薄肥一次。

在商业生产上，对兜兰肥料的稀释程度一般为其他兰科植物肥料的4—10倍，亦即浓度只有其他兰花肥料的1/10—1/4。在生长季节一般每2周施肥一次，而在非生长季节不施肥或尽量少施肥。施肥切忌将肥料放在基质中或土壤中，以免严重伤害兰花植株根部。最佳的选择是将肥料溶于水，稀释后喷洒于叶面与根区。一般认为，兰花植株种植于树皮介质中和在较强的光照条件下生长，较之用有机的复合基质和较荫蔽条件下生长的植株需要更多的肥料。

但是，在非商业用途的栽培者往往主张不施肥料，因为担心盐分的积累会严重伤害兰花植株根部。事实表明，过多的肥料较之肥料不足，对兜兰的伤害要大得多，特别是在光照不足，而且环境较干燥时，患处尤大。他们的经验是：多给光，少施肥，勤淋洗，千万别让基质中的盐分危害兰花植株！

七、种植与换盆 Planting and repotting

种植兜兰和种植其他兰科植物一样，首先是操作中应防止碰伤和注意消毒。

在种植之前，必须将兰花植株冲洗干净，晾干表面水分，然后用消毒过的工具进行清理，包括除去烂根、断根和病叶等。操作中注意勿使新芽和根部受到伤害，也不要用水冰冷的水冲洗植株。

切口的消毒可用1000倍高锰酸钾略加浸泡，浸湿后即可取出，放置10—15 min后再冲洗干净，晾干后即可种植。若怕麻烦，也可以用硫磺粉或木炭粉涂抹切口，以防止感染。

盆栽或换盆前要注意用体积较大的无机基质，如砖瓦碎块或聚苯乙烯等堵住盆底与周围的通气孔，以防止蛞蝓与蜗牛等进入盆中，伤害根部。一般认为要把较粗的基质放在下部，向上逐渐增加较细的基质，但也有人主张粗细搭配，不分上下。种植时植株基部生根处要比基质表面低1—1.5 cm，比盆的边缘低2—2.5 cm，一旦暴露出来要再加基质于其上。

基质在种植或换盆之前必须使之吸湿并保持湿润，表面晾干后即可供换盆之用。换盆前后均不得施肥，换盆或种植后要保持7—14天不浇水，使根部保持韧性，受伤的根部也得以恢复。但在此时期，可以向叶面喷水雾，还要注意保持环境的湿度，以防植物脱水。当基质开始变干，而新根也已伸入新基质之中时，可以恢复浇水。在恢复浇水时，可在水中加少量的生长素和维生素B₁，以利于更快恢复生长。

容器的大小通常要求比根簇直径大1倍以上，但若植株瘦弱，只生有少数根，则可以用小盆。换盆时间最好选择在旺盛的生长期，初期优于晚期。用肉眼观察，当植株的重量明显增加，甚至叶片繁茂地覆盖盆面，基质与土壤并无明显的腐烂、霉变，根部疏松缠绕但不紧抱成团，根尖呈白色而且明显具活力的，就是最好的换盆时期。由于有机基质常会腐烂、霉变，盐分又会不断积累，因此换盆势在必行。通常每1年半至2年必须换盆，但若每年换盆更好，新基质对兰花植株的生长会有很大的作用。

第八章 繁殖技术

PROPAGATION

兜兰属植物的繁殖和其他兰科植物大同小异，也可以分为无性繁殖和有性繁殖两大类。无性繁殖就是营养体自身的繁殖。在自然状态下，植株会发出侧芽，长成新苗；而在栽培的环境中，就靠人为的分株繁殖和组织培养。后者是指在实验室条件下的反复切割，快速增殖。有性繁殖是通过开花、结果，产生种子来进行繁殖。由于所有兰科植物的种子都细如尘土，不含可供发芽和幼苗生长的胚乳，在自然环境中发芽率很低，因此也需要在实验室条件下大规模提高发芽率。下面将着重介绍分株繁殖和种子繁殖，因为兜兰属植物的组织培养尚未见有完全成功和大规模进行克隆、生产种苗的报道。

一、分株繁殖 Dividing

兜兰属植物每年都会从基部的侧芽发出新苗，而老苗并不立即死亡，新苗又不断增多，到一定时间便会形成丛生状态。即使一些具走茎的散生类型，如硬叶兜兰与杏黄兜兰，也并非完全靠走茎繁殖，在良好的生境中也能形成丛生状态。显然，过多的植株挤在一起会引起彼此对阳光、空气、水分和养分的争夺，因此，在人工栽培的条件下，必须及时进行分株，以解决这种矛盾，同时也达到增殖的目的。

兜兰何时可以进行分株是有可辨认的信号的。用肉眼观察，凡是植丛重量明显增加，叶片繁茂并盖满盆面，根系较发达而疏松，就可以进行分株繁殖。但若根系过分发达，紧密缠绕在一起，在分株操作中就会伤害根系，严重影响其后来的生长。分株繁殖的时间一般选在生长期开始之时。兜兰类的生长期并不完全相同，因而要细心观察，选在新芽形成并略伸出之时。但一般说来，春季是大多数兜兰属植物生长的活跃期，所以早春是多种兜兰分株繁殖的好时期。

要注意在分株繁殖前后不要施肥，也不要浇水后立即进行分株。分株时基质必须排干水分。

分株繁殖的操作程序大致如下：

1. 将兰花植株全部取出兰盆，轻摇细抖，将基质完全抖落。
2. 按兰花植株基部自然分界线，也就是离隙较大处，用两手把植丛掰开，分成由每2—3株组成的小丛；若掰不开，也可以用消毒的刀切开。对于辨认自然分界线要靠细心观察，要使每小丛都拥有自己的根系。
3. 种植小丛时用一手握紧小丛，将叶丛最基部或根状茎置于兰盆中心低于盆的边缘2.5 cm处，用另一手将基质填入盆底并压实，再继续填至接近盆面，使

兰花植株得以固定为度。

4. 浇透一次水，使新基质保持湿润而又透气。
5. 整个操作过程中要特别注意勿伤根系与嫩芽；工具要经过消毒；病枯叶烂根要予以清除。

总之，只要选择好应进行分株繁殖的兰苗，掌握最佳时期，小心操作，注意分株后的管理，一般是能够成功的。

二、人工授粉 Artificial pollination

在栽培条件下，要使兜兰属植物更好地结实，或者要培育更好的品种，用人工授粉的方法进行杂交是必不可少的。

杂交育种中最重要的是亲本的选择。即使是同一个物种，其花色、叶姿、抗病能力等也未必是相同的。因此，不论是同种交配抑是异种交配，都要严格选择亲本，并详细记录其形态特征，特别是花、叶性状，如色泽、尺寸、花期长短等。还应当记录杂交时间（包括日期与时刻）、操作方法等。亲本要挂上标签，以防混乱。

选择好亲本，要注意用新鲜的花进行授粉杂交。大多数兜兰在开花1周以后花粉开始成熟，而柱头表面也从稍黏变为成熟。虽然在花朵未开放前，有的花粉已经成熟，但试验表明，若放在柱头上只能产生少量的种子。

成熟的花粉通常暗黄色，有光泽，感觉有黏性，比花初开放时整个花粉团块缩小约1/3。柱头表面在成熟时，也会变得更长些。如果开花的时间过长，其花粉与柱头都会因过时而降低受精和结籽率。

许多兜兰属植物种间杂交没有障碍，对花期不同的种类进行杂交，可以用保存花粉的办法加以解决。大多数植物的花粉可以保藏一年或更长的时间仍有活力，但必须留在花药中，也就是说必须连同花药或整个花朵一起保藏于凉爽、干燥的环境中。通常是放在玻璃容器内或包裹在蜡纸中，并用密封的容器隔开湿气，保藏于冰箱凉爽环境中。任何保藏的花粉都必须记录植物名称及采集花粉的日期。

在对兜兰属植物授粉前，必须将雌雄亲本植物放在一起，下面铺上一张干净的白纸，其目的是易于发现散落的花粉。授粉前首先要把唇瓣的囊切掉，可以用牙签削扁的一端，将花粉团从花药中弄出来。因为花粉囊自身背侧有黏性物质，故可以用木质牙签将其挑出来。但要注意，花粉囊不是很黏的，一不小心便会脱落。此后，要和缓地把它放在要进行杂交的雌株柱头面上，加以紧压并使之粘上去。然后再用花粉囊沿整个柱头面涂抹，以增加花粉与柱头的接触面，但不必直接接触花粉粒。这样会产生较饱满的蒴果。

在切除唇瓣的囊以后，一般不会再有昆虫来访，故不必套袋。但要在植株上挂标签。如果是多花的种类，而每一朵花所接受的雄性花粉都不同，那么必须在每1朵花下方挂上雄株的种名及授粉时间。所有的杂交情况都应记录在专用的本子上。

蒴果的发育大约自授粉后需要4—6个月的时间。要注意观察蒴果从绿色变为黄色的过程,若稍出现褐色就会很快开裂。有些种类虽然其蒴果需要经历12个月才能成熟,也可以在5—7个月时采收并播种。如果让蒴果出现褐色后采收并播种,其发芽率会明显降低,有些种类的种子甚至会进入休眠状态而不发芽。因此,必须密切注意蒴果色泽的变化,最好在绿色即将转入黄色之时或至多在转入黄色的初期采收并播种。只有这个办法才能保证蒴果不开裂,而且无菌播种得以成功。在20世纪70年代初期,人们并不知道这个道理,因而成功率很低。要特别注意,蒴果即使是绿色,采割下来后也会很快就开裂,一旦开裂就难以消毒,所以要尽快在实验室进行无菌播种。

三、无菌播种 Aseptic germination of seeds

虽然组织培养在兰科植物中已被广泛地采用,进行大规模的种苗生产,但在兜兰属植物中只取得有限的进展,而且大多数是在人工杂种中进行试验的(曾宋君等,2007)。例如,利用菲律宾兜兰(*P. philippinense*)的一些人工杂种的叶片作为外植体,诱导出了不定芽和带根的小植株,以及用另一个人工杂种的种子萌发的无菌苗作为外植体,诱导出了丛生芽并能直接成苗;用胼胝兜兰(*P. callosum*)与劳氏兜兰(*P. lawrenceanum*)的人工杂种种子萌发而来的原球茎诱导出愈伤组织并能增殖,还能形成类原球茎,分化出再生芽,形成完整的植株。但总体看来仍处于实验和研究阶段,其主要问题是外植体灭菌难度大,生长速度慢,至今仍未见商业上进行无性克隆大规模生产种苗的报道。

无菌播种是指在实验室条件下的种子萌发、生长和发育。由于兰科植物的种子数量很大,每个蒴果通常可含数万粒(杏黄兜兰每个蒴果含4万—5万粒),或数十万粒,最多的甚至达到三百多万粒,因此用种子大规模繁殖种苗有诱人的前景。但是,种子繁殖的苗,其花形、花色等均不甚一致,尤其是人工杂种,在商业生产上应用存在较大的弱点。其次,兰科植物的种子中不含营养物质胚乳,萌发往往要靠某些真菌的共生,因此发芽率很低。兜兰属是兰科中种子试管培养最困难的属之一,无菌萌发技术难度较大(Arditti & Ernst, 1993)。在对胼胝兜兰(*P. callosum*)和缘毛兜兰(*P. ciliolare*)的研究中发现,有发芽率偏低、原球体发育异常以及褐色死亡等情况出现(Stimart & Ascher, 1981; Pierik et al., 1988)。但也有成功的经验,对德氏兜兰的无菌播种,其种子萌发率达68%,巨瓣兜兰达69.7%,只有菲律宾兜兰较低,仅达32.8%(Li & Li, 1999)。

兜兰属植物的无菌播种简介如下:

(一) 蒴果的选择

上面已经提到,蒴果一般在授粉后4—6个月成熟,当外表皮色泽由绿色变为黄色

的初期，是采收和播种的最佳时期。但是，不同种类的蒴果成熟期是不同的，要仔细观察和进行实验对比方能做出结论，光看色泽也未必是可靠的。由于蒴果采收时间对于种子萌发有极为重要的影响，而且不同地区和不同的栽培条件对于蒴果的成熟时间也必然有一定的差异，因此对授粉时间、地点，蒴果的大小、色泽变化等都要有科学记录，以供参考。例如，对波瓣兜兰的无菌播种试验中发现，以授粉后195—200天的蒴果中种子萌发率最高（Nagashima, 1982）；带叶兜兰授粉后150天左右的蒴果内种子萌发率可达50%（曾宋君等，2006）；对杏黄兜兰和硬叶兜兰的试验表明，授粉后180天蒴果已近开裂，黑色的种子已无萌发力，可能已进入休眠状态（陈之林等，2004）。后者可能是一种适应，因为成熟的种子随风散落后，如果随时随地立即萌发，并不利于自己的生存，而必须在温度和水分的供应合适时方可萌发。这正是兰科，也是兜兰属植物对自然环境的适应，亦即生存之道。但究竟何时休眠，休眠期多长，何时萌发力，能延续多久，何时萌发力最强等，不同的种类并不相同，也可能还会随着栽培条件而变化。例如，上面提到的杏黄兜兰，在广州温室內栽培的条件下，授粉后180天的蒴果内的成熟种子已无萌发力；而在云南昆明荫棚中栽培的条件下，对萌发力的试验结果是：授粉60天的蒴果内种子的萌发率为3.5%，120天的为40%，180天的为18.3%（丁长春等，2004）。除地区和栽培条件不同外，广州的杏黄兜兰是人工自花授粉的，而昆明的植物是人工异花（也是异株）授粉的。究竟是何原因，尚有待于进一步的研究和试验来评判。

（二）消毒和播种

蒴果采割后立即置于70%乙醇浸泡30—60s进行表面灭菌，再用氯化汞（1g/L）灭菌10—15 min，用无菌水清洗后，于无菌操作台内将蒴果纵向剖开，用镊子将种子刮入无菌水中，摇匀后用吸管将种子吸出，注入培养基表面。也可以将蒴果浸泡于95%的乙醇中，用镊子夹起来后，在酒精灯上过火三次即可达到灭菌的目的；然后将蒴果纵向剖开，直接将种子均匀地撒到培养基表面。

（三）培养基

兜兰种子萌发使用的基本培养基有RE (Robert Ernst, 据Arditti, 1982)、MS (Murashige & Skoog, 1962)(1/5—1/2)*、KC (Knudson C, 1946)、VW (Vacin & Went, 1949)、Thomale GD和花宝1号（3 g/L）（美国Hyponex公司生产）（Li & Li, 1999）等。下面列出5种常用的培养基供参考。

* 1/5或1/2 MS培养基是指MS中的大量元素化合物的用量降低至1/5—1/2，其余不变。

RE (Robert Ernst) 培养基

硫酸铵 $(\text{NH}_4)_2\text{SO}_4$	150 mg
硝酸铵 NH_4NO_3	400 mg
硝酸钾 KNO_3	400 mg
磷酸二氢钾 KH_2PO_4	300 mg
硝酸镁 $\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$	100 mg
硝酸钙 $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	150 mg
硫酸亚铁 $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	25 mg
果糖	20 g
木炭粉	2 g
琼脂	16 g
蒸馏水 (加至)	1000 ml
酸碱度 (pH)	5.2 (± 0.2)

MS (Murashige & Skoog, 1962) 培养基

硝酸铵 NH_4NO_3	1650 mg
硝酸钾 KNO_3	1900 mg
氯化钙 $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$	440 mg
硫酸镁 $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	370 mg
磷酸二氢钾 KH_2PO_4	170 mg
碘化钾 KI	0.83 mg
硼酸 H_3BO_3	6.2 mg
硫酸锰 $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$	22.3 mg
硫酸锌 $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$	8.6 mg
钼酸二钠 $\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$	0.25 mg
硫酸铜 $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	0.025 mg
氯化钴 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$	0.025 mg
乙二胺四乙酸二钠 $\text{Na}_2\text{-EDTA}$	37.3 mg
硫酸亚铁 $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	27.8 mg
蔗糖	30 g
琼脂	10 g
蒸馏水 (加至)	1000 ml
酸碱度 (pH)	5.8

KC (Knudson C, 1946) 培养基

硝酸钙 $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	1000 g
磷酸二氢钾 KH_2PO_4	250 mg
硫酸镁 $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	250 mg
硫酸铵 $(\text{NH}_4)_2\text{SO}_4$	500 mg
硫酸亚铁 $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	25 mg
硫酸锰 $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$	7.5 mg
蔗糖	20 g
琼脂	17 g
蒸馏水 (加至)	1000 ml
酸碱度 (pH)	5.8

VW (Vacin & Went, 1949) 培养基

磷酸钙 $\text{Ca}_3(\text{PO}_4)_2$	200 mg
硝酸钾 KNO_3	525 mg
磷酸二氢钾 KH_2PO_4	250 mg
硫酸铵 $(\text{NH}_4)_2\text{SO}_4$	500 mg
酒石酸铁 $\text{Fe}_2(\text{C}_4\text{H}_4\text{O}_6)_3 \cdot 2\text{H}_2\text{O}$	28 mg
硫酸锰 $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$	7.5 mg
硫酸镁 $\text{MgSO}_4 \cdot 4\text{H}_2\text{O}$	250 mg
蔗糖	20 g
琼脂	16 g
蒸馏水 (加至)	1000 ml
酸碱度 (pH)	5.0—5.2

Thomale G D (1954) 培养基

硫酸铵 $(\text{NH}_4)_2\text{SO}_4$	60 mg
硝酸铵 $(\text{NH}_4)\text{NO}_3$	370 mg
硝酸钾 KNO_3	400 mg
磷酸二氢钾 KH_2PO_4	300 mg
硝酸镁 $\text{Mg}(\text{NO}_3)_2$	110 mg
硫酸亚铁 $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	20 mg
果糖	10 g
葡萄糖	10 g
琼脂	16 g
蒸馏水 (加至)	1 000 ml
酸碱度 (pH)	4.8—5.1

根据不同生长阶段的需要, 培养基需要更换、调整或加入必要的有机添加物, 如椰乳、香蕉汁、马铃薯泥、胰蛋白胨、酵母提取物、6-苄基腺嘌呤 (6-BA)、萘乙酸 (NAA)、肌醇、烟酸以及活性炭等。

到目前为止, 对兜兰属植物的无菌播种试验只限于少数种类。虽然已积累了相当的经验, 但同一种类的试验结果常有很大的差异。例如, 用1/5MS、1/4MS、RE等培养基对杏黄兜兰进行无菌播种试验, 其结果并不相同。丁长春等 (2004) 在昆明用授粉后120天的种子在1/5MS培养基上种植16天的萌发率为37.9%, 而在RE培养基上仅达到18.4%, 而陈之林等 (2004) 在广州同样用授粉后120天的种子, 在RE培养基上的萌发率达25.2%, 而在1/4MS培养基上仅为8.1%。当然, 昆明与广州两地的植物栽培条件和授粉情况, 实验室的温度与光照的控制, 以及培养基添加剂等是有明显差异的。然而, 相同的措施对不同的种类, 其效果也并不相同。例如, 在培养基中加入活性炭会抑制带叶兜兰的种子萌发率 (曾宋君等, 2006); 而对巨瓣兜兰则会提高其种子萌发率 (Li & Li, 1999)。从这里也可以看出, 兜兰无菌播种还有很大的研究与探索的空间。

当然, 前人的试验也为我们提供了不少成功的经验。例如, 添加适量的椰乳对兜兰种子的萌发有较好的促进作用; 培养基的盐分浓度对于种子萌发和生长有重要的影响; 早期暗培养至少对地生种类是必要的 (Stimart & Ascher, 1981), 例如, 杏黄兜兰与硬叶兜兰需要3周的暗培养 (陈之林等, 2004)。此外, 还有不同时期的光照、温度和酸碱度控制等, 都需要根据不同的种类和不同的生长时期加以调整。

第九章 病虫害防治

DISEASES AND PESTS

病虫害对兜兰属植物的危害较之其他兰科植物，似乎要轻一些，但也不应乐观。在其他兰花中常见的虫害与病害，在兜兰中也大多存在。下面将做一简单介绍。

一、虫害 Pests

在兜兰属植物中，较常见的害虫有蚜虫、介壳虫、螨、粉虱、蛴螬、蜗牛等。害虫往往匿藏于叶背、新苗、苞片和基质中，要多注意检查，温室地面如有苔藓、藻类等，也会招引蜗牛和蛴螬。此外，蚂蚁会将蚜虫、粉虱和介壳虫搬进温室，也应在防治和清理之列。

(一) 蚜虫

蚜虫的种类很多，危害植物的主要方式是以刺吸式口器刺入植物组织，吸取其液汁养分，引起受害器官营养不良。我国危害兰花的蚜虫主要为桃蚜属 (*Myzus*)、尾蚜属 (*Hyalopterus*) 和棉蚜属 (*Aphis*)。它们也危害兜兰，多见于花、花蕾和嫩芽上，有时也见于幼叶和肉质的花萼上部。蚜虫通常有黑色与绿色两种色泽，有些种类有翅，会飞。蚜虫大多由蚂蚁带到温室来，也可由窗户、通风口、门洞或缝隙进入。它们除吸食兰花植株幼嫩器官的养分，使之生长不良外，还会传染病毒。有些蚜虫的唾液中含有生长素，会破坏植物生长、发育的平衡，严重的会出现缩叶、卷叶、斑污或貌似虫瘿的外形。此外，蚜虫的排泄物，亦即蜜露过多时会阻挡光线，影响光合作用，还会招致霉菌滋生。

蚜虫会蔓延得很快，幼虫只要6—10天即可变为成虫，一年可繁殖十几代或数十代，甚至可营孤雌生殖。蚜虫若数量不大，可用棉球沾乙醇人工清除，若数量较大，则可以用马拉硫磷（50%乳剂）1000—1500倍液、40%氧化乐果（乳剂）1000—2000倍液、2.5%溴氰菊酯（乳剂）2000—3000倍液等灭虫。

(二) 介壳虫

介壳虫又称蚧虫，约有数十种可危害兰花，包括兜兰属植物。虽然介壳虫所造成的危害并不严重，但一旦存在就不易消灭。

介壳虫主要由蚂蚁带进温室或随着新移植的兰花植株进入温室。它们一般不会

大幅度移动，也不会从一个植株移动至另一个植株。介壳虫大致可以分为两类：软壳类与盾壳类。软壳类介壳虫较大，有一个蜡质外壳。它们对兰花植株的危害除了吸食液汁养分外，还会分泌黏性物质以致引起黑霉菌的生长。盾壳类介壳虫较小，常形成棉团状。此种介壳虫只吸食液汁，不分泌黏性物质，但常将有毒物质注入兰花植株，引起生长不良。较常见的介壳虫有兰蛎蚧属 (*Lepidosaphes*)、糖蚧属 (*Parlatoria*)、沟轮蚧属 (*Aulacaspis*) 等的一些种类。

介壳虫繁殖较快，有些种类产卵，有些种类可直接生出小蚧，大多数种类每年可繁殖2—7代，故也应注意及时防治。若数量不多，可用人工清除，亦即用硬毛刷等工具除去虫体。但如果虫害较严重，则需用药物杀虫，如杀螟松（50%乳剂）1000倍液、马拉硫磷（50%乳剂）1000—1500倍液、20%杀灭菊酯（乳剂）2000—3000倍液等，每周或每2周一次。用药应选在若虫孵化期内进行。但由于若虫孵化期不统一，世代不齐，各种虫态常重叠，加上虫体表面有蜡质层，因此防治相当困难。

由于介壳虫性喜潮湿、闷热的环境，因此，改善通风条件，在兰花植株间保持一定的距离，避免过分潮湿，注意环境卫生，也有助于减轻介壳虫的危害。

（三）螨虫

螨虫又叫红蜘蛛，属于叶螨科。叶螨科有许多种类是植食性的，亦即靠吸食植物养分为生，其中最常见的是红蜘蛛属 (*Tetranychus*)。

螨虫形体很小，肉眼不易辨认，但可以看到周围有网状物。植食性的螨虫以锐利的口针刺入叶片组织，吸食栅栏层细胞叶绿素颗粒和细胞其他内含物，引起受害细胞干枯，余下的内含物凝结成块，呈现出黄色或白色小点，并逐渐扩大，使整层细胞坏死。有些螨虫甚至会释放毒素或生长调节物质进入植物组织，破坏平衡，影响植物的正常生长和发育。

螨虫性喜高温、闷热、干旱，一般在早春温度回升后开始活动，夏季达到最高峰，秋季逐渐停止活动，开始越冬。繁殖的最适温度为25—28℃。主要靠爬行传播，也能随风远播。

防治螨虫首先要注意保持环境通风和保持适当的湿度，注意多向叶背喷水，也要及时清除枯叶病叶，将其烧毁。若为害较轻，数量不多时，可用手指抹除或刷子清除。若数量较大，可在成虫、若虫盛发期，用药物杀灭。常用的药物有40%三氯杀螨醇（乳剂）1000倍液、40%氧化乐果（乳剂）1000—2000倍液、80%敌敌畏（乳油）1500—2000倍液等，每周3次，最好交替使用。个别植株发生时，用棉球蘸上煤油揩擦叶面，有明显效果。

（四）蓟马

蓟马成虫体长仅稍长于1 mm，通常有翅，主要吸食花朵与幼嫩或多汁叶的液汁。

最常见的种类为花蓟马 (*Frankliniella intonsa*) 与烟蓟马 (*Thrips tabaci*)。花蓟马主要危害花朵，而烟蓟马则主要危害叶片。受害花朵会出现灰白色的点状食痕与产卵痕，而受害叶片会出现叶组织失绿、变厚、变脆，最后造成落叶。蓟马一年可繁殖6—10代，室外大多以成虫越冬，但在温室中各种虫态均可越冬。在春夏之交，干旱无雨的季节，发展较快，危害较严重。

防治方法首先是改善环境卫生，清草枯叶，消灭虫源。药物杀虫可用40%氧化乐果（乳剂）1000—2000倍液，或50%马拉硫磷（乳油）1000—1500倍液进行喷雾，要特别注意隐蔽之处，一般每周一次。也可以用熏蒸的方法，即用80%的敌敌畏或2.5%溴氰菊酯倒在碟子上，在密闭的条件下和受害兰花植株放在一起，让其自然挥发，以杀灭蓟马。

（五）其他害虫

除上述的害虫外，还有粉虱、蜗牛、蛴螬等也会危害兜兰。粉虱也是靠吸食植物液汁为生的，形体很小，体表有一层白色粉蜡。它们大多躲藏在叶鞘、苞片或其他有皱褶的地方，很喜欢在上部嫩叶叶背栖息、吸食和产卵。受害的叶片会产生卷曲，失绿、发黄，甚至干枯。有些种类还会排出大量的蜜露，覆盖于茎、叶之上，引起黑霉菌丛生，影响光合作用。防治方法与杀灭蚜虫相似。

蜗牛与蛴螬均为软体动物，主要啃食兰花植株幼嫩和含水量大的部位，如根尖、嫩叶、新芽等，被啃食部位还会感染病菌。通常在夜晚活动，白天则潜伏在碎石杂物空隙处，小型蜗牛甚至匿藏在基质中。主要防治方法是夜晚人工捕杀和毒饵诱杀。毒饵多用麦皮拌砒霜或敌百虫，撒在它们经常出现的地方。

二、病害 Diseases

兜兰属植物的病害和其他兰科植物一样，也是由病原体，如真菌、细菌、病毒的感染或环境和生理因素引起的。

（一）真菌病

真菌病对兰科植物，包括兜兰有很大的危害性。寄生性真菌从兰花寄主身上吸取养分，破坏组织，引发许多症状，如霉变、溃疡、枯萎、腐烂、猝倒等，最后导致兰花植株的死亡。

真菌病的传播可以通过空气、水、昆虫、其他动物和人类自身。兜兰属植物中，常见的有害真菌有：引起炭疽病的刺盘孢属 (*Collectotrichum*)、引起黑腐病或心腐病的疫霉属 (*Phytophthora*)、引起萎蔫病的镰孢属 (*Fusarium*)、引起花枯病的葡

葡萄属 (*Botrytis*)，引起根腐病的立枯丝核菌 (*Rhizoctonia solanii*)、引起叶斑污病的托姆青霉 (*Penicillium thomii*)、引起叶干枯病的小丛壳 (*Glomerella cincta*) 等。

1. 兰花炭疽病 (orchid anthracnose) (又称兰花斑点病 orchid spot)

病原：长孢状刺盘孢 (*Collectotrichum gloeosporioides*)、环带刺盘孢 (*C. cinctum*)。

寄主：兜兰属 (*Paphiopedilum*)、卡特兰属 (*Cattleya*)、兰属 (*Cymbidium*)、杓兰属 (*Cypripedium*)、石斛属 (*Dendrobium*)、蕾丽兰属 (*Laelia*)、文心兰属 (*Oncidium*)、蝴蝶兰属 (*Phalaenopsis*)、万带兰属 (*Vanda*)、香荚兰属 (*Vanilla*) 等。

病征：危害叶片和花朵。以叶为例，受害初期出现若干黑褐色或浅灰色的区，内有许多黑色或褐色略下陷的小点，聚生成若干带；带横走或形成同心圈。病斑明显表现为一条条暗色组织，常为黄色带所包围。当黑色病斑发展时，周围组织变为暗褐色或灰色，而且凹陷。病斑大小变化甚大，容易破碎。病斑数量大时会引起病叶枯萎，严重时全株死亡。

防治：剪去被感染的器官并烧毁，注意保证良好的通风和透光条件。药物防治可在发病初期用65%代森锌可湿性粉剂300—500倍液，或70%百菌清可湿性粉剂600—800倍液；若较重可用75%甲基托布津可湿性粉剂1000倍液喷洒。不同的药剂交替使用，效果更好。

2. 兰花黑腐病 (orchid black rot) (又称冠腐病 crown rot、猝倒病 damping off 或心腐病 heart rot)

病原：棕榈疫霉 (*Phytophthora palmivora*)、恶疫霉 (*P. cactorum*)。

寄主：兜兰属 (*Paphiopedilum*)、卡特兰属 (*Cattleya*)、兰属 (*Cymbidium*)、石斛属 (*Dendrobium*)、蕾丽兰属 (*Laelia*)、文心兰属 (*Oncidium*)、蝴蝶兰属 (*Phalaenopsis*)、钻喙兰属 (*Rhynchostylis*)、万带兰属 (*Vanda*)、香荚兰属 (*Vanilla*) 等。

病征：症状在不同的种属和不同栽培条件下并不完全相同。通常多见于叶的下表面，有时先感染幼芽，使得未长成的叶脱落，有时先感染根部或根状茎，然后向上扩展至叶基部。感染初期出现小的褐色斑点，有黄色边缘；然后逐渐扩展，较大与较老的病斑中央变为黑褐色或黑色，在挤压时会渗出水分；而老病斑则变为干燥、黑色。受感染的叶枯萎，最终脱落，靠近叶的基部也明显褪色。此病最终导致整个植株死亡。

防治：切除感染器官，予以烧毁或深埋，污染的基质亦应清除。用含铜的杀菌剂，如0.1%—0.2%硫酸铜液，50%克菌丹可湿性粉剂400—500倍液，50%福美双可湿性粉剂500—700倍液等喷洒。

3. 兰花萎蔫病 (orchid Fusarium wilt) (又称兜兰萎蔫病 Paphiopedilum wilt)

病原：尖镰孢 (*Fusarium oxysporum*)、卡特兰尖镰孢 (*F. oxysporum* f. *cattleyae*)。

寄主：兜兰属 (*Paphiopedilum*)、卡特兰属 (*Cattleya*)、兰属 (*Cymbidium*)、石斛属 (*Dendrobium*)、蝴蝶兰属 (*Phalaenopsis*)、香荚兰属 (*Vanilla*) 等。

病征：主要感染叶丛基部的根状茎，使之出现带状或环状紫色病变，其输导组织也变为粉红紫色，也可扩展至根部。由于输导组织堵塞，叶变为灰色，使植株枯萎而死亡，有时根与茎也伴随腐烂。

防治：消除病株和带菌的基质，用50%克菌丹可湿性粉剂400—500倍液，或50%多菌灵可湿性粉剂500—800倍液喷洒或浇灌基质；亦可用0.5%福尔马林液浸泡基质。

4. 葡萄孢花枯病 (Botrytis blossom blight) [又称花褐腐病 (flower brown rot)、花斑病 (flower spotting)、瓣枯病 (petal blight)、灰霉病 (gray mold)]

病原：灰葡萄孢 (*Botrytis cinerea*) 和该属其他种类。

寄主：兜兰属 (*Paphiopedilum*)、卡特兰属 (*Cattleya*)、兰属 (*Cymbidium*)、石斛属 (*Dendrobium*)、蝴蝶兰属 (*Phalaenopsis*)、香荚兰属 (*Vanilla*) 等。

病征：危害花部，首先花被片上出现非常小的淡褐色水渍斑点；接着逐渐变大，使整个花腐烂。

防治：剪除病花，用80%代森锰可湿性粉剂400—600倍液，或50%多菌灵可湿性粉剂500倍液喷洒，每10—15天一次。湿度（特别是夜间湿度）过高易染此病，应加以注意。

5. 兰花根腐病 (orchid root rot) (又称兜兰根腐病 *Paphiopedilum root rot*)

病原：立枯丝核菌 (*Rhizoctonia solanii*)。

寄主：兜兰属 (*Paphiopedilum*) 及其他兰科植物的幼苗。

病征：可见根部腐烂呈褐色，上有白色或褐色的真菌残留物。叶片色泽变为浅灰色，干枯，有黑褐色斑块，边缘向内卷。

防治：可用80%代森锌可湿性粉剂300—500倍液，或50%退菌特可湿性粉剂的8000倍液淋洗或喷洒，再用40%五氯硝基苯或50%多菌灵拌细土后，掺入土壤，5—6 g/m²，效果良好。

6. 兜兰叶斑污病 (Paphiopedilum leaf blotch)

病原：托姆青霉 (*Penicillium thomii*)。

寄主：兜兰属 (*Paphiopedilum*)。

病征：叶面出现圆形或延长成近椭圆形的斑污。斑污深褐色而有浅褐色边缘，直径1—3.5 cm，主要见于老叶。

防治：一般杀真菌药剂均可使用。

7. 兜兰叶干枯病 (Paphiopedilum leaf dieback)

病原：小丛壳 (*Glomerella cincta*)。

寄主：兜兰属 (*Paphiopedilum*)。

病征：叶尖或上部1/3变褐色，然后向基部蔓延而死亡。

防治：剪去病叶。用50%多菌灵可湿性粉剂500—800倍液，或70%百菌清可湿性粉剂600—800倍液喷洒。

(二) 细菌病

细菌是单细胞的微生物，大多数并不危害生物，但也有大约200种细菌危害植物。其所造成的危害主要是产生毒素，引起腐烂，使组织死亡，或者是堵塞和破坏维管束，影响植物的正常生长。据目前所知，危害兰科植物细菌并不多，主要是欧氏菌属 (*Erwinia*) 和假单胞属 (*Pseudomonas*) 的一些种。它们也危害兜兰属植物。

1. 细菌褐腐病 (bacterial brown rot)

病原：杓兰欧氏菌 (*Erwinia cypripedii*)。

寄主：兜兰属 (*Paphiopedilum*)、兰属 (*Cymbidium*)、杓兰属 (*Cypripedium*)、蝴蝶兰属 (*Phalaenopsis*) 等。

病征：叶面出现水渍状黄白色小斑点，病斑后来变为栗褐色，有可能下陷，常会迅速扩展，毁坏叶片或甚至整个植株。

防治：剪除病叶，然后用200 mg/L农用链霉素或0.5%波尔多液喷洒，每10天一次。此病多见于温暖、潮湿的环境，应多注意通风，避免过高的温度与湿度。

2. 细菌软腐病 (bacterial soft rot)

病原：欧氏菌 (*Erwinia carotovora*)。

寄主：兜兰属 (*Paphiopedilum*)、卡特兰属 (*Cattleya*)、兰属 (*Cymbidium*)、文心兰属 (*Oncidium*)、蝴蝶兰属 (*Phalaenopsis*)、万代兰属 (*Vanda*) 等。

病征：主要在幼叶或嫩芽上，有时也在叶片上，出现水渍状小斑点，然后变为褐色或近黑色，并迅速变大，进而覆盖整个叶面。斑点最终发展成一个柔软的、有恶臭的腐烂块，引起叶片死亡乃至整个植株死亡。感染途径主要通过伤口。夏初阴雨季节为此病多发期。

防治：应注意伤口消毒，不论虫咬、剪切、触碰等形成的伤口均需用波尔多混合剂涂抹。全株可在0.1%高锰酸钾溶液中浸泡5 min，清洗后在阳光下晒15 min，阴干后再种植。用0.5%波尔多液或200 mg/L农用链霉素喷洒也有一定效果。

3. 细菌褐斑病 (bacterial brown spot)

病原：卡特兰假单胞 (*Pseudomonas cattleyae*)、杓兰假单胞 (*P. cypripedii*)。

寄主：兜兰属 (*Paphiopedilum*)、卡特兰属 (*Cattleya*)、兰属 (*Cymbidium*)、杓兰属 (*Cypripedium*)、石斛属 (*Dendrobium*)、蝴蝶兰属 (*Phalaenopsis*)、万代兰属 (*Vanda*) 等。

病征：受害植株首先在叶面出现柔软的、水渍状的小斑点；继而发展成轮廓清晰的、凹陷的黑色或褐色斑点。有时斑点为水疱状，联合在一起，周围有浅绿色或黄色晕圈。此病害常扩展迅速，会引起整个植株死亡。

防治：可根据受害情况，剪除病叶或甚至清除整个植株。一般可用0.5%波尔多液或200 mg/L农用链霉素喷洒，或在0.1%高锰酸钾溶液中浸泡5 min，洗净后再行种植。

4. 细菌花腐病 (bacterial rot)

病原：假单胞 (*Pseudomonas aeruginosa*)、荧光假单胞 (*P. fluorescens*)。

寄主：兜兰属 (*Paphiopedilum*)、卡特兰属 (*Cattleya*)、兰属 (*Cymbidium*) 等，主要是它们的栽培品种。

病征：主要为花上出现烂斑，包括一些小的坏死病斑，以及呈水渍状的晕圈等。

防治：剪除病花，并注意整个植株和土壤的消毒。防治方法与药物见“细菌褐斑病”。

(三) 病毒病

病毒是由蛋白质包围的核酸组成，一般只有数十或数百纳米大小。以齿舌兰环斑病毒 (ORSV) 为例，大小约为 $18 \text{ nm} \times 300 \text{ nm}$ ($1 \text{ nm} = 1/1\,000\,000 \text{ mm}$)。它可以感染植物，包括兰科植物，在寄主细胞内复制，迅速扩展，引起寄主生长不良，出现种种病征。

对于病毒的命名通常采用：植物属名+表现的病征+病毒病原体。例如，国兰花叶病毒的命名为 *Cymbidium mosaic virus* (CyMV)。目前已知感染兰科植物的病毒接近 30 种，但大多见于栽培的杂交品种之中，在野生兰中极为罕见。

控制病毒目前仍无有效的方法，只有坚决消除病株，以防止其蔓延。目前国际上常用的消毒液是：① 2% 的福尔马林和 2% 的氢氧化钠溶液；② 164 g 无水的或 377 g 含结晶水的磷酸三钠 (Na_3PO_4) 加水 1 L (1000cc)。用来消毒工具与环境等。

病毒对兜兰属植物感染很少报道。仅有坏死花叶病一种简介如下：

坏死花叶病 (necrotic mosaic) [又称国兰花叶病 (*Cymbidium mosaic*)、兰花花叶病 (*orchid mosaic*) 和黑条坏死病 (*black streak*)]。

病原：国兰花叶病毒 (CyMV)。

寄主：兜兰属 (*Paphiopedilum*)、兰属 (*Cymbidium*)、石斛属 (*Dendrobium*)、蝴蝶兰属 (*Phalaenopsis*)、万代兰属 (*Vanda*)、香荚兰属 (*Vanilla*) 等。

病征：因环境和种类而异。通常早期叶面出现不规则的萎黄色花斑，然后变成褐色或黑褐色坏死斑；也有在叶下表面出现长条状坏死组织；在有些种类中会出现长方形的、黄化的断续线条，然后坏死；在某些品种中，叶下表面会出现褐色或黑色的下陷斑或甚至同心圆。严重的会导致叶片死亡。

(四) 其他非细菌性病

兜兰属植物与其他兰科植物一样，性喜洁净。若环境污染，灰尘过多会使叶表面受腐蚀；过强的日光会灼伤叶片，出现黄化、焦枯；过高的温度，特别是夜间高温，可使植物生长不良，甚至落叶；过多过浓的肥分会增加基质盐分积累，引起叶尖干枯或叶片枯萎；微量元素不足也会使兰花植株呈现种种病态。其中，过多的施肥、不足的光照和缺乏良好的通风，应是种植兜兰之大忌，必须引起注意。

第十章 兜兰属非国产种类简介

SYNOPSIS OF THE NON-CHINESE TAXA OF PAPHIOPEDILUM

本书将兜兰属划分为79种，其中52种和一些变种不产于中国。为了满足国内外读者的需要，本章将简单介绍非国产种类，并提供一个分种检索表。

Paphiopedilum is treated as a genus of 79 species in the present book, 52 of which, including a few varieties, are not found in China. In order to meet the needs of the readers in China and abroad, a synopsis is given of the foreign taxa, and a key is provided to them.

兜兰属非国产种类检索表

1. 唇瓣近球形、椭圆形或卵形，先端边缘内弯（宽瓣亚属subgen. *Brachypetalum*）。
 2. 唇瓣近球形，长度与宽度相近，粉红色或白色而有粉红色晕，先端内弯边缘宽4—5 mm（小萼组sect. *Parvisepalum*）.....**1. 越南兜兰***P. vietnamense*
 2. 唇瓣椭圆形或近卵形，长度大于宽度，白色或具紫色斑点，先端内弯边缘宽1—2 mm（同色组sect. *Concoloria*）。
 3. 花序柄长4—8 cm；花瓣具密集的紫褐色斑点.....**2. 古德兜兰***P. godefroyae*
 3. 花序柄通常长达20 cm；花瓣几乎不具或稍具紫褐色斑点.....**3. 雪白兜兰***P. niveum*
1. 唇瓣盔状或拖鞋状，先端边缘不内弯（兜兰亚属subgen. *Paphiopedilum*）。
 4. 花序具（2—）3至多花；花瓣的长度为宽度的5倍以上。
 5. 花依次展现，在同一时间只有1花或至多2花开放；花瓣近水平伸展，边缘具长缘毛（多花短瓣组sect. *Cochlopetalum*）。
 6. 叶背面具排成横带的紫色斑点，整个边缘具明显的缘毛.....**37. 李氏兜兰***P. liemianum*
 6. 叶背面浅绿色或近基部有紫色斑，不具或仅基部和先端边缘具缘毛。
 7. 叶上面具深浅绿色相间的网格斑.....**39. 玛丽兜兰***P. victoria-mariae*
 7. 叶上面全部绿色。
 8. 唇瓣纯黄色（浅紫变种var. *purpurascens*唇瓣下半部带紫色晕）；退化雄蕊绿色.....**38. 报春兜兰***P. primulinum*
 8. 唇瓣粉红色至带紫色，具密集的深紫色细斑点；退化雄蕊上半部近黑紫色、浅栗色或暗绿色。
 9. 叶上面近蓝绿色或苍绿色，背面浅绿色，宽4.5—5.5 cm；唇瓣不具或稍具紫

- 色斑点；退化雄蕊上半部近黑紫色或浅栗色.....36. 苍叶兜兰 *P. glaucophyllum*
9. 叶上面绿色，背面近基部有紫色晕，宽6—9.5 cm；唇瓣具浓密的紫色斑点；退化雄蕊上半部暗绿色.....40. 多花兜兰 *P. victoria-regina*
5. 花近于同时展现，几乎全部的花均在同一时间开放；花瓣通常下弯或近于下垂，边缘具短缘毛或长缘毛。
10. 唇瓣具宽在5 mm以上的内弯侧裂片；退化雄蕊倒卵状楔形或倒卵形，上面基部有1枚角状或钩状突起物（多花长瓣组sect. *Pardalopetalum*）。
11. 子房被短毛；退化雄蕊乳黄色，上半部具褐色斑块，先端具弯缺和1枚中央尖齿.....34. 楼氏兜兰 *P. lowii*
11. 子房被长柔毛；退化雄蕊浅黄绿色，具白色细斑点，近先端有1个绿色斑块，先端有缺刻.....35. 黑氏兜兰 *P. haynaldianum*
10. 唇瓣具宽不到2 mm的不甚明显的内弯侧裂片；退化雄蕊不为倒卵状楔形或倒卵形，不具上述的突起物（多花无耳组sect. *Coryopedilum*）。
12. 花序柄无毛。
13. 叶宽5—12 cm；唇瓣浅黄绿色或橄榄绿色，具深色脉；花瓣长5—7（—11）cm；退化雄蕊先端不为微缺或2裂.....45. 柯氏兜兰 *P. kolopakingii*
13. 叶宽3.5—5.5 cm；唇瓣浅紫红色或红褐色，有深色脉；花瓣长8—15 cm；退化雄蕊先端微缺或2裂。
14. 中萼片宽卵形，宽在4 cm以上，具4—5条暗栗色脉；花瓣长12—15 cm；退化雄蕊长约1.4 cm.....46. 斯通兜兰 *P. stonei*
14. 中萼片卵形，宽约2.5 cm，具9—11条暗褐色脉；花瓣长8—9 cm；退化雄蕊长约8 mm.....53. 曲蕊兜兰 *P. supardii*
12. 花序柄被毛。
15. 花瓣丝带状，长30—60 cm.....43. 长须兜兰 *P. sanderianum*
15. 花瓣线形或丝带状，短于20 cm。
16. 叶宽8—12 cm.....44. 巨叶兜兰 *P. gigantifolium*
16. 叶宽3—7 cm。
17. 退化雄蕊近线形，在中部呈屈膝状，宽4—5 mm；子房无毛.....52. 若氏兜兰 *P. rothschildianum*
17. 退化雄蕊不为近线形，中部不呈屈膝状，宽4—12 mm；子房被毛或无毛。
18. 花瓣线形，长度不足5 cm；退化雄蕊很小，长约5 mm.....42. 然氏兜兰 *P. randsii*
18. 花瓣线形并向先端渐狭或丝带状，长5—16 cm；退化雄蕊长8—14 mm。
19. 退化雄蕊近直立，丝毫不覆盖柱头与雄蕊；子房无毛.....48. 棉岛兜兰 *P. adductum*
19. 退化雄蕊平伸，完全覆盖柱头和雄蕊；子房被毛或变无毛。
20. 花瓣长12—16 cm；子房被短柔毛；退化雄蕊宽约8 mm，具绿色脉.....

-41. 菲律宾兜兰 *P. philippinense*
20. 花瓣长5—13 cm; 子房无毛或被疏毛; 退化雄蕊宽9—12 mm, 不具绿色脉。
21. 花瓣长9—13 cm; 退化雄蕊先端具细尖.....49. 疣点兜兰 *P. glanduliferum*
21. 花瓣长5—7 cm; 退化雄蕊先端不具细尖。
22. 花瓣多少下垂, 下侧边缘强烈皱波状; 退化雄蕊近矩圆形, 长度明显超过宽度.....50. 皱瓣兜兰 *P. ooi*
22. 花瓣近平展或下弯, 边缘不为皱波状; 退化雄蕊近方形, 长度与宽度近相等。
23. 子房被密毛; 花瓣下半部边缘具4—6个被毛的疣状体; 退化雄蕊先端有凹缺.....47. 苏岛兜兰 *P. intaniae*
23. 子房无毛或被疏毛; 花瓣不具或基部边缘偶见疣状体; 退化雄蕊先端无凹缺.....51. 威后兜兰 *P. wilhelminiae*
4. 花序具单花或极罕2花; 花瓣通常长度不到宽度的5倍。
24. 叶全部绿色, 无网格斑; 唇瓣在其内弯侧裂片上一般不具疣状突起 (兜兰组 sect. *Paphiopedilum*) 。
25. 花瓣镰刀状, 多少呈S形, 边缘具长达2 mm的缘毛....6. 费氏兜兰 *P. fairrieianum*
25. 花瓣非镰刀状, 亦不呈S形, 边缘不具上述的长缘毛。
26. 植物在地下不具长的横走根状茎; 中萼片中央具凸起的栗色斑点.....
-4. 边远兜兰 *P. exul*
26. 植物在地下具长达150 cm的横走根状茎; 中萼片中央具1条栗色纵带.....
-5. 南印兜兰 *P. druryi*
24. 叶上面具深浅绿色相间的斑或网格斑; 唇瓣通常在其内弯侧裂片上具疣状突起 (单花斑叶组 sect. *Barbata*) 。
27. 花瓣不具斑点或只在基部具模糊的斑点。
28. 花白色至近绿白色, 有绿色脉.....13. 布干岛兜兰 *P. bougainvilleanum*
28. 花不为白色或近绿白色, 通常花瓣上有紫色或红紫色晕。
29. 花瓣长7—8.5 cm; 退化雄蕊先端为骤尖式短尖.....25. 沙巴兜兰 *P. dayanum*
29. 花瓣长3.5—5.3 cm; 退化雄蕊先端微缺、具缺刻或有弯缺。
30. 中萼片椭圆形, 长4.3—6.1 cm, 两面被微柔毛; 花瓣向下弯垂.....
-10. 桑氏兜兰 *P. sangii*
30. 中萼片宽卵形, 长2.7—3.3 cm, 上面无毛; 花瓣下弯或水平伸展。
31. 唇瓣橄榄绿色, 具暗色脉, 有时有近褐色晕; 退化雄蕊宽度明显超过长度, 先端所具的弯缺深度为退化雄蕊长度的1/5—1/4....14. 青紫兜兰 *P. violascens*
31. 唇瓣明显呈褐色, 有暗色脉; 退化雄蕊宽度略超过长度, 先端所具的弯缺深度为退化雄蕊长度的1/3.....15. 所罗门兜兰 *P. wentworthianum*
27. 花瓣明显具斑点。

32. 唇瓣在囊的前端边缘具1个短尖头（细尖）；退化雄蕊轮廓近方形，先端不具弯缺.....**28. 尖齿兜兰***P. acmodontum*
32. 唇瓣不具上述的短尖头；退化雄蕊轮廓不为近方形，先端具明显的弯缺。
33. 退化雄蕊具6—7条绿色纵条纹.....**32. 民岛兜兰***P. urbanianum*
33. 退化雄蕊不具上述绿色纵条纹。
34. 花瓣整个具暗栗色或黑紫色斑点。
35. 花瓣边缘具疣状体。
36. 花瓣具较大的斑点，至少部分斑点的直径超过2 mm；退化雄蕊有深绿色脉，先端的侧裂片明显大于中央的齿.....**17. 斑瓣兜兰***P. argus*
36. 花瓣具较小的斑点，大多数斑点的直径小于1.5 mm；退化雄蕊不具深绿色脉，先端侧生的齿与中央的齿大小相近.....**26. 缘毛兜兰***P. ciliolare*
35. 花瓣边缘不具疣状体。
37. 花瓣具密集的大斑点，至少部分的大斑点直径超过1.5 mm.....**33. 苏氏兜兰***P. sukhakulii*
37. 花瓣具小斑点，小斑点直径全部小于1 mm。
38. 叶背面基部有紫色晕；中萼片具紫色与绿色脉；退化雄蕊宽14—20 mm.....**27. 华丽兜兰***P. superbiens*
38. 叶背面无紫色晕；中萼片只具暗绿色或绿色脉；退化雄蕊宽9—10 mm。
39. 中萼片宽3.8—4.3 cm，浅绿色，具绿色纵条纹；花瓣近水平伸展，上端1/3强烈后弯.....**22. 苏吉兜兰***P. sugiyamanum*
39. 中萼片宽2.5—2.9 cm，近白色，具暗绿色纵条纹；花瓣近下弯，不后弯。
40. 花瓣上栗色小斑点近圆形；唇瓣囊表面有不甚明显的暗色脉纹.....**29. 爪哇兜兰***P. javanicum*
40. 花瓣上栗色小斑点近横矩圆形；唇瓣囊表面有明显的暗褐色网纹.....**30. 帕氏兜兰***P. parnatanum*
34. 花瓣在边缘或有时在基部、中部或前部具斑点。
41. 叶背面具浓密的紫褐色斑.....**16. 洁净兜兰***P. tonsum*
41. 叶背面绿色或偶见有模糊的紫褐色斑，极罕在近基部具紫色晕。
42. 花瓣在边缘具被毛的疣状体。
43. 花瓣在上下边缘均具被毛的疣状体。
44. 叶宽4—6.5 cm；中萼片宽达6 cm，宽度超过合萼片的1倍.....**24. 劳氏兜兰***P. lawrenceanum*
44. 叶宽2—4 cm；中萼片宽3—4.8 cm，宽度不到合萼片的1倍。
45. 花瓣近水平伸展，先端强烈后弯，长3—4.5 cm.....**21. 恒氏兜兰***P. hennisianum*
45. 花瓣下弯，略呈S形，不后弯，长4—6 cm.....**23. 佛氏兜兰***P. fowliei*

43. 花瓣只在上侧边缘具被毛的疣状体。
46. 唇瓣绿色，具深色脉纹，外表面被微柔毛；退化雄蕊先端两侧的齿强烈内弯.....**31. 休氏兜兰***P. schoseri*
46. 唇瓣暗栗色、紫栗色或铜褐色，外表面无毛；退化雄蕊先端两侧的齿镰刀状，稍微内弯或几乎不内弯。
47. 花瓣下弯，与水平线相交角度为10—15°，不呈S形；退化雄蕊先端中央具细尖.....**18. 髯毛兜兰***P. barbatum*
47. 花瓣下弯，与水平线相交角度为40—45°，呈S形；退化雄蕊先端中央不具细尖.....**19. 胼胝兜兰***P. callosum*
42. 花瓣边缘不具或有时具无毛的疣状体。
48. 退化雄蕊先端具短尖.....
.....**7. 齿瓣兜兰（变种）***P. appletonianum* var. *tridentatum*
48. 退化雄蕊先端具缺刻或有弯缺。
49. 中萼片具宽阔的近黄白色或浅黄绿色的边缘。
50. 花瓣匙形，下半部边缘波状，中脉两侧均具栗色斑点；中萼片卵形，宽2.3—2.9 cm.....**9. 虎克兜兰***P. hookerae*
50. 花瓣近匙形的矩圆形，边缘不为波状，主要在中脉的上侧具栗色斑点或疣状斑；中萼片宽卵形，宽3.2—4.9 cm.....
.....**11. 马氏兜兰***P. mastersianum*
49. 中萼片不具宽阔的浅色边缘。
51. 花瓣上面具少数疣状斑点或无毛的疣状突起.....
.....**8. 布玲兜兰***P. bullenianum*
51. 花瓣上面不具疣状斑点或疣状突起。
52. 花瓣近矩圆状匙形，下部边缘波状；中萼片绿色，有暗红色脉，具狭窄的白色边缘.....**12. 巴布亚兜兰***P. papuanum*
52. 花瓣狭矩圆形，边缘不为波状；中萼片白色，有绿色纵条纹.....
.....**20. 朴氏兜兰***P. potentianum*

Key to the non-Chinese taxa of *Paphiopedilum*

1. Lip subglobose, ellipsoid or ovoid, with its apical margins incurved (subgenus *Brachypetalum*).
 2. Lip subglobose, nearly as long as wide, pink or white flushed with pink, with its apical incurved margins 4–5 mm wide (sect. *Parvisepalum*).....**1. *P. vietnamense***
 2. Lip ellipsoid or subovoid, longer than wide, white or spotted with purple, with its incurved apical margins 1–2 mm wide (sect. *Concoloria*).
 3. Peduncle 4–8 cm long; petals densely spotted with purple-brown**2. *P. godefroyae***
 3. Peduncle often up to 20 cm long; petals scarcely or slightly spotted with purple-brown**3. *P. niveum***
1. Lip helmet-shaped or slipper-shaped, with its apical margins not incurved (subgen. *Paphiopedilum*).
 4. Inflorescence with (2–) 3 or more flowers; petals often over five times longer than wide.
 5. Flowers produced successively, only one or at most two opening at a time; petals almost spreading horizontally, long-ciliate (sect. *Cochlopetalum*).
 6. Leaves purple-spotted in transverse bands abaxially, conspicuously ciliate all along margins.....**37. *P. liemianum***
 6. Leaves pale green or marked with purple toward the base abaxially, not ciliate or ciliate on basal and apical margins only.
 7. Leaves tessellated with dark and light green adaxially.....**39. *P. victoria-mariae***
 7. Leaves uniformly green adaxially.
 8. Lip pure yellow (or flushed with purplish in lower half as found in var. *purpurascens*); staminode green.....**38. *P. primulinum***
 8. Lip pink to purplish, densely small-spotted with deep purple; staminode blackish-purple, pale maroon or dark green in apical half.
 9. Leaves bluish-green or glaucous adaxially, pale green abaxially, 4.5–5.5 cm wide; lip not or slightly spotted with purple; staminode blackish-purple to pale maroon in apical half.....**36. *P. glaucophyllum***
 9. Leaves green adaxially, flushed with purple toward abaxial base, 6–9.5 cm wide; lip heavily spotted with purple; staminode dark green in apical half.....**40. *P. victoria-regina***
 5. Flowers produced more or less simultaneously, almost all opening at the same time; petals often deflexed or nearly pendulous, short-ciliate or long-ciliate.
 10. Lip with markedly incurved side-lobes over 5 mm wide; staminode obovate-cuneate or obovate, with a horn-shaped or hook-shaped protuberance at adaxial base (sect.

- Pardalopetalum*).
11. Ovary shortly hairy; staminode cream, brown-blotched in apical half, with a sinus and a central tooth apically.....**34. *P. lowii***
11. Ovary villose; staminode pale yellow-green, minutely white-spotted, green-blotched toward its apex, incised apically.....**35. *P. haynaldianum***
10. Lip with inconspicuous incurved side-lobes less than 2 mm wide; staminode not ovate-cuneate nor obovate, lacking a protuberance as above (sect. *Coryopedilum*).
12. Peduncle glabrous.
13. Leaves 5–12 cm wide; lip pale yellow-green or olive-green, with darker veins; petals 5–7 (–11) cm long; staminode not emarginate nor bilobed apically.....**45. *P. kolopakingii***
13. Leaves 3.5–5.5 cm wide; lip pale purple-red or red-brown, with darker veins; petals 8–15 cm long; staminode emarginate or bilobed apically.
14. Dorsal sepal broadly ovate, over 4 cm wide, with 4–5 dark maroon veins; petals 12–15 cm long; staminode ca. 1.4 cm long.....**46. *P. stonei***
14. Dorsal sepal ovate, ca. 2.5 cm wide, with 9–11 dark brown or maroon veins; petals 8–9 cm long; staminode ca. 8 mm long.....**53. *P. supardii***
12. Peduncle hairy.
15. Petals ribbon-like, 30–60 cm long.....**43. *P. sanderianum***
15. Petals linear to ribbon-like, less than 20 cm long.
16. Leaves 8–12 cm wide.....**44. *P. gigantifolium***
16. Leaves 3–7 cm wide.
17. Staminode sublinear, geniculate in the middle, 4–5 mm wide; ovary glabrous..
.....**52. *P. rothschildianum***
17. Staminode not sublinear nor geniculate in the middle, 4–12 mm wide; ovary hairy or glabrous.
18. Petals linear, less than 5 cm long; staminode very small, ca. 5 mm long.....
.....**42. *P. randsii***
18. Petals linear-tapering or ribbon-like, 5–16 cm long; staminode 8–14 mm long.
19. Staminode suberect, not covering the stigma and stamens at all; ovary glabrous**48. *P. adductum***
19. Staminode porrect, covering the stigma and stamens completely; ovary hairy or glabrescent.
20. Petals 12–16 cm long; ovary pubescent; staminode ca. 8 mm wide, with green veins.....**41. *P. philippinense***
20. Petals 5–13 cm long; ovary glabrous or sparsely hairy; staminode 9–12 mm wide, lacking green veins.

21. Petals 9–13 cm long; staminode apiculate at apex...**49. *P. glanduliferum***
21. Petals 5–7 cm long; staminode not apiculate at apex.
22. Petals more or less pendent, strongly crisped on the margins of the lower side; staminode suboblong, conspicuously longer than broad.....**50. *P. ooi***
22. Petals almost spreading horizontally or deflexed, never crisped-margined; staminode subsquare, nearly as long as broad.
23. Ovary densely hairy; petals with 4–6 hairy warts on margins in basal half; staminode emarginate apically.....**47. *P. intaniae***
23. Ovary glabrous or sparsely hairy; petals lacking or occasionally with a few warts on basal margins; staminode not emarginate apically.....**51. *P. wilhelminiae***
4. Inflorescence with one or very rarely two flowers; petals often less than five times longer than wide.
24. Leaves uniformly green, not tessellated; lip commonly not warted on its incurved side-lobes (sect. *Paphiopedilum*)
25. Petals falcate, somewhat sigmoid, margins with long cilia up to 2 mm long.....**6. *P. fairrieinum***
25. Petals not falcate nor sigmoid, margins lacking long cilia as above.
26. Plants lacking a long creeping rhizome underground; dorsal sepal with raised maroon spots centrally.....**4. *P. exul***
26. Plants with a creeping rhizome up to 150 cm long underground; dorsal sepal with a maroon longitudinal band centrally.....**5. *P. druryi***
24. Leaves mottled or tessellated with dark and light green adaxially; lip commonly warted on its incurved side-lobes (sect. *Barbata*).
27. Petals unspotted or only faintly spotted near base.
28. Flower white to greenish-white, with green veins.....**13. *P. bougainvilleanum***
28. Flower not white nor greenish-white, often flushed with purple or red-purple on the petals.
29. Petals 7–8.5 cm long; staminode cuspidate-mucronate apically.....**25. *P. dayanum***
29. Petals 3.5–5.3 cm long; staminode emarginate, incised or with a sinus apically.
30. Dorsal sepal elliptic, 4.3–6.1 cm long, puberulous on both surfaces; petals deflexed-pendulous.....**10. *P. sangii***
30. Dorsal sepal broadly ovate, 2.7–3.3 cm long, glabrous on adaxial surface; petals deflexed or spreading horizontally.
31. Lip olive-green, with darker veins, sometimes flushed with brownish; staminode much broader than long, with an apical sinus about 1/5–1/4 the

- length of the staminode itself.....**14. *P. violascens***
31. Lip conspicuously brown-flushed, with darker veins; staminode slightly broader than long, with an apical sinus about 1/3 the length of the staminode itself..... **15. *P. wentworthianum***
27. Petals conspicuously spotted.
32. Lip with a short point (apiculum) on the front margin of the pouch; staminode subsquare in outline, lacking a sinus apically.....**28. *P. acmodontum***
32. Lip without a short point as above; staminode not subsquare in outline, with a clear sinus apically.
33. Staminode with 6–7 green stripes longitudinally.....**32. *P. urbanianum***
33. Staminode lacking green stripes as above.
34. Petals spotted all over with dark maroon or blackish-purple.
35. Petals warted on margins.
36. Petals with larger spots at least partly over 2 mm in diam.; staminode veined with deep green, its apical side-lobes much larger than the central tooth.....
.....**17. *P. argus***
36. Petals with smaller spots mostly less than 1.5 mm in diam.; staminode not veined with deep green, its apical side teeth equal in size to the central one...
.....**26. *P. ciliolare***
35. Petals not warted on margins.
37. Petals densely marked with larger spots at least partly over 1.5 mm in diam...
.....**33. *P. sukhakulii***
37. Petals marked with small spots all less than 1 mm in diam.
38. Leaves flushed with purple at abaxial base; dorsal sepal veined with purple and green; staminode 14–20 mm wide..... **27. *P. superbiens***
38. Leaves not flushed with purple abaxially; dorsal sepal veined with deep green or green; staminode 9–10 mm wide.
39. Dorsal sepal 3.8–4.3 cm wide, pale green, longitudinally green-striped; petals almost spreading horizontally, strongly recurved in apical one third
..... **22. *P. sugiyamanum***
39. Dorsal sepal 2.5–2.9 cm wide, more or less whitish, longitudinally dark green-striped; petals deflexed or nearly so, not recurved.
40. Maroon spots on the petals suborbicular; lip inconspicuously with darker veins on the surface.....**29. *P. javanicum***
40. Maroon spots on the petals transverse-oblong; lip conspicuously with dark brown nets on the surface.....**30. *P. parnatanum***
34. Petals spotted on margins or sometimes also on basal, middle or apical surfaces.

41. Leaves heavily mottled with pale purple-brown abaxially.....**16. *P. tonsum***
41. Leaves green or occasionally obscurely mottled with pale purple-brown abaxially, very rarely flushed with purple toward abaxial base.
42. Petals with hairy warts on margins.
43. Petals bearing hairy warts on the margins of both upper and lower sides.
44. Leaves 4–6.5 cm wide; dorsal sepal up to 6 cm wide, over twice wider than synsepal.....**24. *P. lawrenceanum***
44. Leaves 2–4 cm wide; dorsal sepal 3–4.8 cm wide, less than twice wider than synsepal.
45. Petal almost spreading horizontally, strongly recurved apically, 3–4.5 cm long**21. *P. hennisianum***
45. Petals deflexed and somewhat sigmoid, never recurved, 4–6 cm long.....**23. *P. fowliei***
43. Petals bearing hairy warts on the margin of the upper side only.
46. Lip green, with deeper venation, puberulous on outer surface; staminode with strongly incurved lateral teeth apically.....**31. *P. schoseri***
46. Lip dark maroon, purple-maroon or bronze-brown, glabrous on outer surface; staminode with falcate or slightly to scarcely incurved lateral-teeth apically.
47. Petals decurved at an angle of 10–15 degrees with horizontal, not sigmoid; staminode with a central apiculum apically.....**18. *P. barbatum***
47. Petals decurved at an angle of 40–45 degrees with horizontal, sigmoid; staminode lacking a central apiculum apically.....**19. *P. callosum***
42. Petals not or sometimes with glabrous warts on margins.
48. Staminode mucronate apically.....**7. *P. appletonianum* var. *tridentatum***
48. Staminode incised or with a sinus apically.
49. Dorsal sepal with a broad yellowish-white or pale yellow-green margin.
50. Petals spatulate, undulate-margined in basal half, with maroon spots on both sides of the midvein; dorsal sepal ovate, 2.3–2.9 cm wide.....**9. *P. hookerae***
50. Petals subspatulate-oblong, not undulate-margined, with maroon spots or wart-like spots mainly on upper side of the midvein; dorsal sepal broadly ovate, 3.2–4.9 cm wide.....**11. *P. mastersianum***
49. Dorsal sepal lacking a broad paler margin.
51. Petals with a few wart-like spots or glabrous warts adaxially.....**8. *P. bullenianum***
51. Petals with neither wart-like spots nor glabrous warts adaxially.
52. Petals suboblong-spatulate, undulate-margined in basal half; dorsal sepal green, with dark red veins, narrowly white-margined.....**12. *P. papuanum***

52. Petals narrowly oblong, not undulate-margined; dorsal sepal white, longitudinally green-striped.....**20. *P. potentianum***

1. 越南兜兰 (图10-1) (Fig. 10-1)

Paphiopedilum vietnamense Gruss & Perner in Die Orchidee Beih. 5: 3. 1999 (11 Jan.).

Paphiopedilum hilmari Senghas & Schettler

Paphiopedilum mirabile Cavestro & Chiron

叶3—5枚，矩圆状椭圆形，长9—15（—25）cm，宽2.8—4（—7）cm，上面有暗绿色与浅灰绿色相间的网格斑，背面具紫色斑点或有紫色晕。花葶直立，长15—23（—26）cm，紫褐色，被毛；苞片宽卵形，长1.5—2.8 cm，背面被毛；花梗与子房长2.2—3.6 cm，密被白色毛；花单朵或有时2朵，直径9—12 cm；中萼片与合萼片粉红色至乳白色，近顶端常有深粉红色晕；花瓣乳白色、粉红色或浅紫色，通常在上半部色泽较深；唇瓣亦为乳白色、粉红色或浅紫色，前方有深紫色晕；退化雄蕊浅黄色，具白边，中央有绿色斑块；中萼片卵状椭圆形，长4—5 cm，宽2—2.8 cm，先端急尖或渐尖；合萼片与中萼片相似，略短而宽，先端2齿；花瓣近椭圆形，长5—6 cm，宽3—4 cm，先端钝或浑圆；唇瓣深囊状；囊近球形，长、宽各2.5—3.5（—4）cm，先端边缘内卷；退化雄蕊宽卵状菱形，长、宽各1.5—2 cm，边缘具缘毛。

花期：园中栽培为2—3月。

分布：越南北部。



图 10-1. 越南兜兰

Fig. 10-1. *Paphiopedilum vietnamense*
Gruss & Perner

Leaves 3–5, oblong-elliptic, 9–15 (–25) cm long, 2.8–4 (–7) cm wide, adaxially tessellated with dark green and grayish-green, abaxially spotted or flushed with purple. Scape erect, 15–23 (–26) cm long, purple-brown, hairy; bracts broadly ovate, 1.5–2.8 cm long, hairy abaxially; pedicel and ovary 2.2–3.6 cm long, densely white-hairy; flowers single or sometimes 2, 9–12 cm across; dorsal sepal and synsepal pink to whitish, often flushed with deep pink toward the apex; petals whitish, pink or purplish, often deeper-colored in apical half; lip whitish, pink or purplish, flushed with deep purple on front surface; staminode pale yellow, white-margined, with a green blotch centrally; dorsal sepal ovate-elliptic, 4–5 cm long, 2–2.8 cm wide, acute or acuminate

at apex; synsepal similar to dorsal sepal, slightly shorter and broader than it, bidentate apically; petals subelliptic, 5–6 cm long, 3–4 cm wide, obtuse or rounded apically; lip deep pouched; pouch subglobose, 2.5–3.5 (–4) cm long and wide, with involute margins apically; staminode broadly ovate-rhombic, 1.5–2 cm long and wide, ciliate.

Flowering period: February and March in cultivation.

Distribution: N Vietnam.

2. 古德兜兰 (图10-2) (Fig. 10-2)

Paphiopedilum godefroyae (God.-Leb.) Stein, Orchideenbuch: 468. 1892.

Cypripedium godefroyae God.-Leb. in Orchidophile 1883: 830. 1883.

Cypripedium concolor Lindl. var. *godefroyae* (God.-Leb.) Collett & Hemsley

Cypripedium godefroyae God.-Leb. var. *leucochilum* Rolfe

Paphiopedilum godefroyae (God.-Leb.) Stein var. *leucochilum* (Rolfe) Hallier

Cordula godefroyae (God.-Leb.) Rolfe

Paphiopedilum leucochilum (Rolfe) Fowlie

Paphiopedilum ang-thong Fowlie

Paphiopedilum godefroyae (God.-Leb.) Stein var. *ang-thong* (Fowlie) Braem

Paphiopedilum godefroyae f. *leucochilum* (Rolfe) Braem & Chiron

叶4—6枚，狭矩圆形，长14—19 cm，宽2—4 cm，先端钝，上面有深浅绿色相间的网格斑，背面具密集的深紫色斑点。花葶直立，长4—12 cm，紫色，被短柔毛；苞片宽卵形，长1—1.5 cm，紫色，被短柔毛；花梗和子房长2.4—3.6 cm，被短柔毛；花单朵或2朵，乳白色；萼片与花瓣上有紫色斑点和条纹；唇瓣与退化雄蕊上有时有紫色细斑点；中萼片凹陷，宽卵形或近圆形，长、宽各2.5—3.2 cm，先端钝，两面被微柔毛；合萼片小于中萼片；花瓣矩圆状椭圆形，长3—4 cm，宽2—2.7 cm，先端略钝，边缘常波状；唇瓣深囊状；囊椭圆形，长2—2.5 cm，宽1.4—1.8 cm，先端边缘内卷；退化雄蕊横椭圆形，长7—8 mm，宽9—11 mm，先端具1—3齿，上表面被微柔毛。 $2n=26$ 。



图 10-2. 古德兜兰

Fig. 10-2. *Paphiopedilum godefroyae* (God.-Leb.) Stein

花期：园中栽培为6—7月。

分布：泰国南部。

说明：该种之下已知有1个变型得到承认：白花变型 *f. album* Gruss (2002)。

Paphiopedilum thaianum Iamwiriyakul (Orchid Rev. 114: 278. 2006) 产于泰国。它的花白色，但萼片与花瓣近基部处，特别是背面基部具紫红色斑纹；退化雄蕊中央常有绿色至黄绿色脉纹。此种植物颇似古德兜兰 (*P. godefroyae*)，特别是它的白化型；而且也与雪白兜兰 (*P. niveum*) 近似，只是程度稍次而已。它最好作为古德兜兰或雪白兜兰的一个变型，或者视为两者之间的天然杂种。但进一步的研究是必要的。

Leaves 4–6, narrowly oblong, 14–19 cm long, 2–4 cm wide, obtuse at apex, adaxially tessellated with dark and pale green, abaxially densely spotted with deep purple. Scape erect, 4–12 cm long, purple, pubescent; bract broadly ovate, conduplicate, 1–1.5 cm long, purple, pubescent; pedicel and ovary 2.4–3.6 cm long, pubescent; flowers single or two, whitish, spotted and striped with purple on the sepals and petals; lip and staminode sometimes minutely purple-spotted; dorsal sepal concave, broadly ovate or suborbicular, 2.5–3.2 cm long and wide, obtuse at apex, puberulous on both surfaces; synsepal smaller than dorsal sepal; petals oblong-elliptic, 3–4 cm long, 2–2.7 cm wide, subobtuse at apex, often undulate-margined; lip deep pouched; pouch ellipsoid, 2–2.5 cm long, 1.4–1.8 cm wide, apical margins involute; staminode transversely elliptic, 7–8 mm long, 9–11 mm wide, one- to three-toothed apically, puberulous above. $2n=26$.

Flowering period: June and July in cultivation.

Distribution: S Thailand.

Note: One form of this species has received recognition: *f. album* Gruss (2002).

Paphiopedilum thaianum Iamwiriyakul was described from Thailand (in Orchid Rev. 114: 278. 2006). Its flower is white, with sepals and petals more or less marked with purple-red towards their base, particularly on dorsal base; staminode often veined with green to yellow-green centrally. This entity is rather similar to *P. godefroyae*, especially its albino form, and also to a lesser degree to *P. niveum*. It would be best to be treated as a form of *P. godefroyae* or *P. niveum*, or a natural hybrid between them, but a further investigation is needed.

3. 雪白兜兰 (图10-3) (Fig. 10-3)

Paphiopedilum niveum (Rchb. f.) Stein, Orchideenbuch: 478. 1892.

Cypripedium niveum Rchb. f. in Gard. Chron.: 1038. 1869.

Cypripedium concolor (Bateman) Pfitzer var. *niveum* (Rchb. f.) Rchb. f.

Cordula nivia (Rchb. f.) Rolfe

叶4—6枚, 近椭圆形, 长4.5—15 cm, 宽2—3.5 cm, 上面有深浅绿色与浅灰绿色相间的网格斑, 背面具浓密的紫色斑点, 先端浑圆、微缺。花葶长20—25 cm, 紫色, 密被白色短柔毛; 苞片宽卵形, 长10—12 mm, 具紫色斑纹; 花梗和子房长4—4.5 cm, 密被短柔毛; 花1—2朵, 直径6—8 cm, 白色, 在花瓣与唇瓣上常有紫色细斑点; 退化雄蕊中央黄色; 中萼片宽卵形, 长2—4 cm, 宽2.5—4.5 cm; 合萼片较中萼片狭窄; 花瓣椭圆形或近矩圆形, 长3—3.8 cm, 宽1.8—3.2 cm, 先端浑圆; 唇瓣深囊状; 囊椭圆形或椭圆状卵形, 长2—2.5 cm, 宽1.3—1.7 cm, 先端边缘内卷; 退化雄蕊宽卵形, 长6—8 mm, 宽9—11 mm, 先端具1—3齿。2n=26。

花期: 园中栽培为6—7月。

分布: 马来西亚北部、新加坡、泰国南部。

说明: 坡雷兜兰(杂种) [*Paphiopedilum* × *pereirae* (Ridl.) P. Taylor] (in *Orchid Rev.* 84: 219. 1976) 为该种与边远兜兰 (*P. exul*) 之间的天然杂种, 产于泰国。此外, 该种之下有1个得到承认的纯白变型 *f. album* (hort.) Gruss (1999)。

Leaves 4–6, subelliptic, 4.5–15 cm long, 2–3.5 cm wide, adaxially tessellated with dark and grayish-green, abaxially heavily spotted with purple, rounded and emarginate at apex. Scape 20–25 cm long, purple, densely white-pubescent; bracts broadly ovate, 10–12 mm long, marked with purple; pedicel and ovary 4–4.5 cm long, densely pubescent; flowers 1–2, 6–8 cm across, white, often minutely spotted with purple on the petals and lip; staminode with a yellow center; dorsal sepal broadly ovate, 2–4 cm long, 2.5–4.5 cm wide; synsepal narrower than dorsal sepal; petals elliptic or suboblong, 3–3.8 cm long, 1.8–3.2 cm wide, rounded at apex; lip deep pouched; pouch ellipsoid or ellipsoid-ovoid, 2–2.5 cm long, 1.3–1.7 cm wide, with involute margins apically; staminode broadly ovate, 6–8 mm long, 9–11 mm wide, with 1–3 teeth apically. 2n=26.

Flowering period: June and July in cultivation.

Distribution: N Malaysia, Singapore, S Thailand.

Note: *Paphiopedilum* × *pereirae* (Ridl.) P. Taylor (in *Orchid Rev.* 84: 219. 1976), a natural hybrid between this species and *P. exul*, was described from Thailand. In addition, there is an recognized albino form of this species: *f. album* (hort.) Gruss (1999).

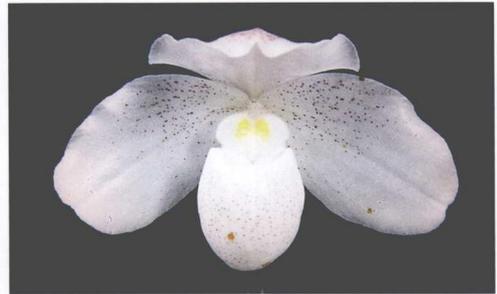


图 10-3. 雪白兜兰

Fig. 10-3. *Paphiopedilum niveum* (Rchb. f.) Stein

4. 边远兜兰 (图10-4) (Fig. 10-4)

Paphiopedilum exul (Ridl.) Kerchove in Livre Orchid.: 478. 1894.

Cypripedium insigne Lindl. var. *exul* Ridl. in Gard. Chron. ser. 3, 10: 94. 1891.

Cypripedium exul (Ridl.) Rolfe

Cordula exul (Ridl.) Rolfe

叶常近直立, 4—5枚, 狭矩圆形, 长18—35 cm, 宽1.8—3.8 cm, 浅绿色或浅黄绿色, 先端钝并有不等的2浅裂。花葶直立, 长13—30 cm, 被紫色短柔毛; 苞片椭圆形, 长4—4.4 cm, 浅绿色至浅黄绿色; 花梗和子房长3—4.5 cm, 被紫色短柔毛; 花

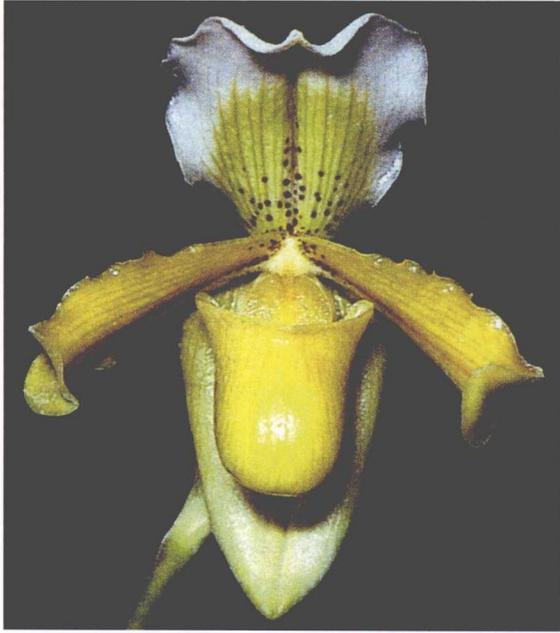


图 10-4. 边远兜兰

Fig. 10-4. *Paphiopedilum exul* (Ridl.) Kerchove

单朵, 直径6—6.5 cm; 中萼片黄色或绿黄色, 具宽阔的白色边缘, 中央有凸起的栗色斑点; 合萼片浅黄绿色, 有暗色脉; 花瓣黄色或黄绿色, 具暗色侧脉和浅栗色的中央脉, 近基部有栗色斑点; 唇瓣浊黄色或绿黄色, 有暗色脉; 退化雄蕊黄色; 中萼片宽椭圆形, 长3—4.8 cm, 宽2.5—3 cm, 背面被微柔毛; 合萼片矩圆状椭圆形, 与中萼片近等长, 但较狭; 花瓣矩圆状倒披针形, 长4.3—5 cm, 宽1.4—1.7 cm, 边缘波状; 唇瓣盔状; 囊卵形, 长约3 cm, 宽2 cm, 囊口两侧呈耳状; 退化雄蕊宽倒卵形, 长6—8 mm, 宽7—9 mm, 中央有脐状突起。2n=26。

花期: 野外为5—6月。

分布: 泰国。

说明: 波维兜兰 (杂种)

(*Paphiopedilum* × *powellii* Christenson) [in Die Orchidee 47 (4): 220. 1996]被认为是此种与胼胝兜兰 (*P. callosum*) 之间的天然杂种。此外, 此种之下有1个得到承认的黄花变型 *f. aureum* (hort.) Gruss & Roellke (2000)。

Leaves often suberect, 4—5, narrowly oblong, 18—35 cm long, 1.8—3.8 cm wide, pale green or pale yellow-green, obtuse and unequally bilobulate at apex. Scape erect, 13—30 cm long, purplish-pubescent; bract elliptic, 4—4.4 cm long, pale green to pale yellow-green; pedicel and ovary 3—4.5 cm long, purple-pubescent; flower single, 6—6.5 cm across; dorsal sepal yellow or green-yellow, broadly white-margined, with raised maroon spots centrally; synsepal pale yellow-green, with darker veins; petals yellow or yellow-green, with some

darker lateral veins and pale maroon median veins, maroon-spotted toward the base; lip buff or green-yellow, with darker veins; staminode yellow; dorsal sepal broadly elliptic, 3–4.8 cm long, 2.5–3 cm wide, abaxially puberulous; synsepal oblong-elliptic, nearly as long as the dorsal sepal, but narrower; petals oblong-ob lanceolate, 4.3–5 cm long, 1.4–1.7 cm wide, undulate-margined; lip helmet-shaped; pouch ovoid, ca. 3 cm long, 2 cm wide, auriculate on both sides of its mouth; staminode broadly obovate, 6–8 mm long, 7–9 mm wide. $2n=26$.

Flowering period: May and June in the wild.

Distribution: Thailand.

Note: *Paphiopedilum* × *powellii* Christenson [in *Die Orchidee* 47 (4): 220. 1996] was considered to be a natural hybrid between this species and *P. callosum*. Besides, there is a yellow-flowered form of this species known to us: f. *aureum* (hort.) Gruss & Roellke (2000).

5. 南印兜兰 (图10-5) (Fig. 10-5)

Paphiopedilum druryi (Bedd.) Stein, Orchideenbuch: 466. 1892.

Cypripedium druryi Bedd., Ic. Pl. Ind. Occ. 1:23, t. 112. 1874.

Cordula druryi (Bedd.) Rolfe

植物具横走的、长可达150 cm的根状茎。叶5—7枚，狭矩圆形，长12—30 cm，宽2.5—4 cm，浅绿色，有暗色脉。花葶直立，长达30 cm；苞片卵形，长1.2—2 cm，绿色，被紫毛；花梗和子房长4—5 cm，紫色，被毛；花单朵，直径6—6.5 cm，浅绿黄色或黄色；中萼片与花瓣上有暗色脉和1条栗褐色中央纵带；合萼片色较浅，有2条黑紫色纵线；唇瓣有时有模糊的浅栗色斑；退化雄蕊中央的脐状突起呈深黄色；中萼片椭圆形或宽卵形，长3—4.5 cm，宽2.5—3.6 cm，被微柔毛；合萼片卵形，长2.7—3.8 cm，宽2—2.7 cm；花瓣近矩圆形，长4—4.5 cm，宽1.3—2.1 cm，上面基部具紫色长毛；唇瓣盔状；囊椭圆状卵形，长2.5—3.5 cm，宽1.2—2 cm，囊口两侧呈耳状；退化雄蕊倒心形，长、宽各10—12 mm，中央有脐状突起。2*n*=26, 30。

花期：野外为1—4月。

分布：印度南部。



图 10-5. 南印兜兰

Fig. 10-5. *Paphiopedilum druryi* (Bedd.) Stein

Plants with a creeping rhizome up to 150 cm long. Leaves 5–7, narrowly oblong, 12–30 cm long, 2.5–4 cm wide, pale green, with darker veins. Scape erect, up to 30 cm long; bract ovate, 1.2–2 cm long, green, purple-hairy; pedicel and ovary 4–5 cm long, purple, hairy; flower single, 6–6.5 cm across, pale green-yellow or yellow; dorsal sepal and petals with darker veins and a maroon-brown longitudinal band centrally; synsepal paler, with 2 black-purple longitudinal lines; lip sometimes obscurely marked with

pale maroon; staminode with a deep yellow umbo; dorsal sepal elliptic or broadly ovate, 3–4.5 cm long, 2.5–3.6 cm wide, puberulous; synsepal ovate, 2.7–3.8 cm long, 2–2.7 cm wide; petals suboblong, 4–4.5 cm long, 1.3–2.1 cm wide, with long purple hairs toward adaxial base; lip helmet-shaped; pouch ellipsoid-ovoid, 2.5–3.5 cm long, 1.2–2 cm wide, auriculate on both sides of its mouth; staminode obcordate, 10–12 mm long and wide, with a central umbo. 2*n*=26, 30.

Flowering period: January to April in the wild.

Distribution: S India.

6. 费氏兜兰 (图10-6) (Fig. 10-6)

Paphiopedilum fairrieianum (Lindl.) Stein, Orchideenbuch: 467.1892.

Cypripedium fairrieianum Lindl. in Gard. Chron.: 740. 1857.

Paphiopedilum assamicum Linden ex K. Koch & Fintelm.

Cordula fairrieana (Lindl.) Rolfe

Paphiopedilum fairrieianum var. *giganteum* Pradhan

Paphiopedilum fairrieianum var. *nigrescens* Pradhan

叶4—8枚, 狭矩圆形, 长7.5—28 cm, 宽2—3 cm, 上面绿色或暗绿色, 有时有模糊的斑, 背面浅绿色。花葶长10—20 (—45) cm, 绿色, 被紫色毛; 苞片椭圆形, 长1—4 cm, 乳白色, 被紫色毛; 花梗和子房长3.5—6 cm, 紫色, 被毛; 花单朵或罕有2朵; 中萼片、合萼片与花瓣白色或绿白色, 有紫色纵脉; 唇瓣黄绿色至橄榄绿, 有紫色脉; 退化雄蕊黄色, 中央有绿色与紫色脉; 中萼片椭圆形至卵形, 长3.4—8 cm, 宽2.5—7 cm, 边缘波状, 具缘毛; 合萼片卵形, 长2.4—3.5 cm, 宽1.7—2.5 cm; 花瓣狭矩圆形, 多少呈弓形, 长4—5 cm, 宽0.9—1.5 cm, 边缘波状并具长达2 mm的缘毛; 唇瓣盔状; 囊椭圆形, 长3—4 cm, 宽1.6—2.3 cm; 退化雄蕊宽椭圆形, 长约9 mm, 宽7 mm。2n=26。

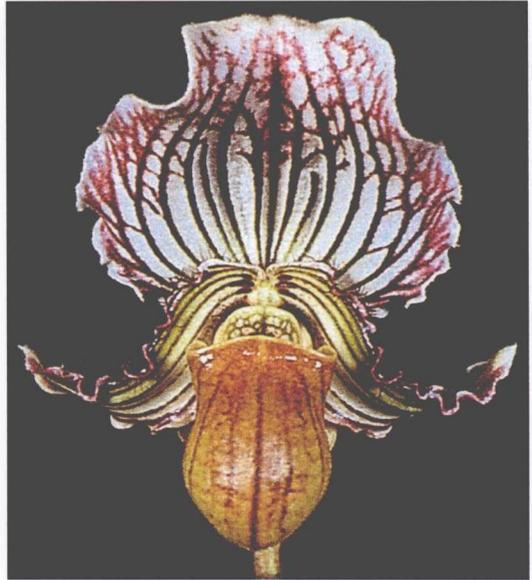


图 10-6. 费氏兜兰

Fig. 10-6. *Paphiopedilum fairrieianum* (Lindl.) Stein

花期: 野外为10月至翌年1月。

分布: 不丹、印度 (东北部、锡金)。

说明: 普拉兜兰 (杂种) (*Paphiopedilum* × *pradhanii* Pradhan) (in *Indian Orchids: Guide Identif. & Cult.* 2: 675. 1979) 为该种与秀丽兜兰 (*P. venustum*) 之间的天然杂种, 产于不丹与印度。此外, 在该种之下已发表诸多的变种与变型, 其中, 只有波曼变型 f. *bohlmannianum* (Matho) Braem (1998) 可被承认。

Leaves 4—8, narrowly oblong, 7.5—28 cm long, 2—3 cm wide, adaxially green or dark green, sometimes faintly mottled, abaxially pale green. Scape 10—20 (—45) cm long, green, purple-hairy; bracts elliptic, 1—4 cm long, whitish, purple-hairy; pedicel and ovary 3.5—6 cm long, purple, hairy; flowers single or rarely two; dorsal sepal, synsepal and petals white or greenish-white, with purple longitudinal veins; lip yellow-green to olive-green, veined with purple; staminode yellow, veined with green and purple centrally; dorsal sepal elliptic to ovate, 3.4—8 cm long, 2.5—7 cm wide, undulate-margined, ciliate; synsepal ovate, 2.4—3.5 cm

long, 1.7–2.5 cm wide; petals narrowly oblong, more or less bow-shaped, 4–5 cm long, 0.9–1.5 cm wide, undulate-margined, with long cilia up to 2 mm long; lip helmet-shaped; pouch ellipsoid, 3–4 cm long, 1.6–2.3 cm wide; staminode broadly elliptic, ca. 9 mm long, 7 mm wide. $2n=26$.

Flowering period: October to January in the wild.

Distribution: Bhutan, India (NE and Sikkim).

Note: *Paphiopedilum* × *pradhanii* Pradhan) (in Indian Orchids: Guide Identif. & Cult. 2: 675. 1979), a natural hybrid of this species and *P. venustum*, was found in Bhutan and India. In addition, many varieties and forms of this species have been described, among which only f. *bohlmannianum* (Matho) Braem (1998) can be recognized.

7. 齿瓣兜兰 (变种) (图10-7) (Fig. 10-7)

***Paphiopedilum appletonianum* (Gower) Rolfe var. *tridentatum* (S. C. Chen & Z. J. Liu)**S. C. Chen & Z. J. Liu, comb. & stat. nov. **Type:** Vietnam, without precise locality, cult., Z. J. Liu 2014! (holotype NOCC!)*Paphiopedilum tridentatum* S. C. Chen & Z. J. Liu in Acta Phytotax. Sin. 39(5):455. 2001.*Paphiopedilum cerveranum* Braem*Paphiopedilum puberulum* S. P. Lei & J. Yong Zhang*Paphiopedilum angustifolium* R. F. Guo & Z. J. Liu

叶4—5枚，狭椭圆状矩圆形，长10—16 cm，宽1.8—3.5 cm，上面有深浅绿色相间的网格斑，背面浅绿色。花葶长达45 cm，紫褐色，密被白色短柔毛；苞片宽卵形，长约1.4 cm，绿色，基部紫褐色，背面被毛；花梗与子房长达6 cm，紫褐色，密被白色短柔毛；花单朵，直径约10 cm；中萼片绿色，下半部具浅紫色脉，近基部有一条横的栗色带；合萼片绿色，有模糊的浅紫色脉；花瓣浅紫色，下半部有绿色晕并有黑色斑点；唇瓣浅绿紫色；退化雄蕊紫黑色，中央和边缘浅绿色；中萼片宽卵形，长约3.2 cm，宽2.5 cm，背面被白色微柔毛；合萼片卵形，小于中萼片；花瓣匙形，长约5 cm，

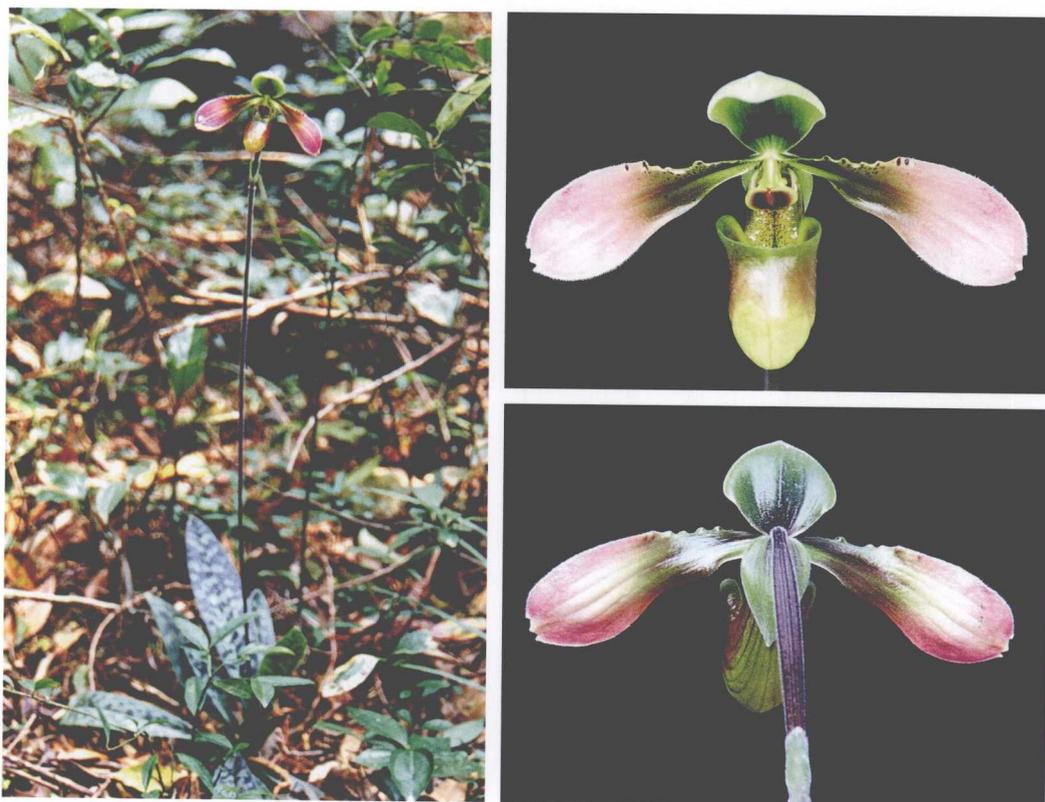


图 10-7. 齿瓣兜兰

Fig. 10-7. *Paphiopedilum appletonianum* (Gower) Rolfe var. *tridentatum* (S. C. Chen & Z. J. Liu)
S. C. Chen & Z. J. Liu

宽2.1 cm, 先端有3小齿; 唇瓣盔状, 内弯的侧裂片上有疣状突起; 囊长约2.4 cm, 宽1.8 cm, 囊口两侧呈耳状; 退化雄蕊近横矩圆形, 长约8 mm, 宽10 mm, 先端具短尖。

花期: 园中栽培为3月。

分布: 越南。

说明: 此植物虽然外形颇似卷萼兜兰 (*P. appletonianum*), 两者实际上是不同的。对花的检视表明, 凡是具倒心形或新月形退化雄蕊的, 唇瓣前端边缘都有深的缺刻, 而具近横矩圆形和先端短尖的退化雄蕊的, 则不具此种缺刻。这两种特征是彼此相关联的。但不混淆。例如, 在《越南的兜兰》(Averyanov et al., 2003) 一书中, 图180: a、c、d、e、g、n都属于这个实体, 而图180: b、f、h-m和图181则属于卷萼兜兰。齿瓣兜兰(变种)和卷萼之间的差别甚至超过了卷萼兜兰与布玲兜兰 (*P. bullenianum*) 之间的差别。鉴于它们是同地生长的, 故我们把它作为卷萼兜兰的变种。

Leaves 4–5, narrowly oblong-elliptic, 10–16 cm long, 1.8–3.5 cm wide, adaxially tessellated with dark and light green, abaxially pale green. Scape up to 45 cm long, purple-brown, densely white-pubescent; bract broadly ovate, ca. 1.4 cm long, green, purple-brown at base, hairy abaxially; pedicel and ovary up to 6 cm long, purple-brown, densely white-pubescent; flower single, ca. 10 cm across; dorsal sepal green, veined with pale purple in basal half, with a maroon transverse band toward the base; synsepal green, obscurely veined with pale purple; petals pale purple, flushed with green and black-spotted in basal half; lip pale green-purple; staminode purple-black, with pale green center and margins; dorsal sepal broadly ovate, ca. 3.2 cm long, 2.5 cm wide, white-puberulous abaxially; synsepal ovate, smaller than dorsal sepal; petals spatulate, ca. 5 cm long, 2.1 cm wide, 3-denticulate apically; lip helmet-shaped, warty on its incurved side-lobes; pouch ca. 2.4 cm long, 1.8 cm wide, auriculate on both sides of its mouth; staminode transversely suboblong, ca. 8 mm long, 10 mm wide, mucronate apically.

Flowering period: March in cultivation.

Distribution: Vietnam.

Note: Although this entity looks similar to *P. appletonianum*, they are actually distinct. An examination of their flowers shows that all the flowers with an obcordate or lunate staminode have a deep incisure on the front margin of the lip, while those with a transversely suboblong and mucronate-tipped staminode lack such an incisure. These two features are interrelated, but not confused with each other. In *Slipper Orchids of Vietnam* (Averyanov et al., 2003), for example, the figure 180: a, c, d, e, g and n belong to this entity, while the figure 180: b, f, h to m and figure 181 to *P. appletonianum*. The differences between these two taxa are even more noticeable than those between *P. appletonianum* and *P. bullenianum*. Considering they are sympathy, we treat it here as a variety of *P. appletonianum*.

8. 布玲兜兰 (图10-8) (Fig. 10-8)

Paphiopedilum bullenianum (Rchb. f.) Pfitzer in Bot. Jahrb. Syst. 19: 40. 1894.

Cypripedium bullenianum Rchb. f. in Bot. Zeit. 23: 99. 1865.

Cypripedium hookerae Rchb. f. var. *bullenianum* (Rchb. f.) Veitch

Paphiopedilum hookerae (Rchb. f.) Stein var. *bullenianum* (Rchb. f.) Kerch.

Paphiopedilum amabile Hallier f.

Cypripedium hookerae Rchb. f. var. *amabile* (Hallier f.) Kraenzl.

Cordula bulleniana (Rchb. f.) Rolfe

Cypripedium robinsonii Ridl.

Cordula amabilis (Hallier f.) Merr.

Paphiopedilum robinsonii (Ridl.) Ridl.

Paphiopedilum linii Schoser

Paphiopedilum johorense Fowlie & Yap

Paphiopedilum tortipetalum Fowlie

Paphiopedilum bullenianum var. *johorense* (Fowlie & Yap) Braem, C. Baker & M. Baker

叶4—8枚，倒披针状椭圆形至近椭圆形，长7—15 cm，宽2.5—4 cm，上面有深浅绿色相间的网格斑，背面有时有模糊的浅紫褐色斑。花葶长可达55 cm，绿色或浅紫色，被短柔毛；苞片卵状椭圆形，长1.5—2.1 cm，背面被毛；花梗和子房长4—6 cm，绿色，有紫褐色斑，被短柔毛；花通常单朵，直径约9.5 cm；中萼片浅绿色，具暗绿色或紫色纵脉，近基部常有暗紫色斑；合萼片浅绿色，有深色脉；花瓣紫红色，具绿色或绿黄色基部和边缘，常在下半部靠近边缘处具栗黑色无毛疣状突起；唇瓣土黄色至浅绿色，有紫红色晕；退化雄蕊绿黄色，中央有2个深绿色斑块；中萼片近卵形，



图 10-8. 布玲兜兰

Fig. 10-8. *Paphiopedilum bullenianum* (Rchb. f.) Pfitzer

长2.4—3 cm, 宽1.4—2.2 cm, 背面被微柔毛; 合萼片近卵形或狭卵形, 长1.9—2.5 cm, 宽1—1.5 cm; 花瓣匙形至倒披针形, 长3.8—5.2 cm, 宽0.9—1.4 cm, 边缘具缘毛; 唇瓣盔状, 内弯的侧裂片上具疣状突起; 囊椭圆状卵形, 长3.5—4.5 cm, 宽2.5—3 cm, 囊口两侧多少呈耳状; 退化雄蕊近圆形或宽卵状菱形, 长、宽各6—8 mm, 先端有深弯缺, 有时弯缺中央有尖齿。2n=40。

花期: 园中栽培为2—4月。

分布: 印度尼西亚(苏门答腊、加里曼丹)、马来西亚。

说明: 该种的变种印尼兜兰(变种) *P. bullenianum* var. *celebesense* (Fowlie & Birk) P. J. Cribb (Genus *Paphiopedilum*: 167. 1987)产于印度尼西亚苏拉威西和塞兰岛, 它与布玲兜兰(*P. bullenianum* var. *bullenianum*)的区别点在于花瓣斑点较少而且较短, 唇瓣也较短。

Leaves 4–8, oblanceolate-elliptic to subelliptic, 7–15 cm long, 2.5–4 cm wide, adaxially tessellated with deep and pale green, abaxially sometimes obscurely mottled with pale purple-brown. Scape up to 55 cm long, green or pale purple, pubescent; bract ovate-elliptic, 1.5–2.1 cm long, abaxially hairy; pedicel and ovary 4–6 cm long, green marked with purple, pubescent; flower usually single, ca. 9.5 cm across; dorsal sepal pale green, with dark green or purple longitudinal veins, marked with dark purple toward the base; synsepal pale green, with darker veins; petals purple-red, with green or green-yellow base and margins, often with glabrous maroon-black warts near the margins in basal half; lip ochre to pale green, flushed with purple-red; staminode green-yellow, with two deep green blotches centrally; dorsal sepal subovate, 2.4–3 cm long, 1.4–2.2 cm wide, abaxially puberulous; synsepal subovate or narrowly ovate, 1.9–2.5 cm long, 1–1.5 cm wide; petals spatulate to oblanceolate, 3.8–5.2 cm long, 0.9–1.4 cm wide, ciliate; lip helmet-shaped, warted on its incurved side-lobes; pouch ellipsoid-ovoid, 3.5–4.5 cm long, 2.5–3 cm wide, more or less auriculate on both sides of its mouth; staminode suborbicular or broadly ovate-rhombic, 6–8 mm long and wide, incised apically, sometimes with a tooth centrally. 2n=40.

Flowering period: February to April in cultivation.

Distribution: Indonesia (Sumatra, Kalimantan), Malaysia.

Note: *P. bullenianum* var. *celebesense* (Fowlie & Birk) P. J. Cribb (Genus *Paphiopedilum*: 167. 1987) is a native of Sulawesi and Ceram of Indonesia. It differs from the typical variety (*P. bullenianum* var. *bullenianum*) by having few-spotted and shorter petals and shorter lip.

9. 虎克兜兰 (图10-9) (Fig. 10-9)

Paphiopedilum hookerae (Rchb. f. ex Hook. f.) Stein, Orchideenbuch: 470. 1892.

Cypripedium hookerae Rchb. f. ex Hook. f. in Curtis's Bot. Mag. 89: t. 5362. 1863.

Cordula hookerae (Rchb. f. ex Hook. f.) Rolfe

叶5—6枚，矩圆状椭圆形，长7—23 cm，宽2.7—5 cm，上面有明显的暗绿与浅绿相间的网格斑，背面浅绿色。花葶长达50 cm，浅褐紫色，被灰白色毛；苞片卵状披针形，长2—3 cm，绿色或浅紫褐色，被毛；花梗和子房长约5 cm，绿色，被毛；花单朵，直径8—10 cm；中萼片与合萼片绿色，边缘黄白色或浅黄绿色，有暗色脉；花瓣绿色，边缘和上部1/3为紫红色，下部2/3有浅黑色斑点；唇瓣下部浅绿色，上部紫褐色；退化雄蕊紫红色，中央绿黄色或浅黄色；中萼片卵形或宽卵形，长3—4 cm，宽2.3—2.9 cm；合萼片椭圆形，明显小于中萼片；花瓣匙形，长4—5.5 cm，宽1.5—2.2 cm，具缘毛；唇瓣盔状，内弯侧裂片上具褐色疣状突起；囊近椭圆形，长2.6—3.1 cm，宽1.7—2 cm，囊口两侧略呈耳状；退化雄蕊近圆形，长、宽各约1 cm，先端具弯缺。2n=28。

花期：野外为3—4月。

分布：文莱、印度尼西亚（加里曼丹）、马来西亚（沙捞越）。

说明：该种与沙巴兜兰（*P. dayanum*）之间的天然杂种：希普兜兰（杂



图 10-9. 虎克兜兰

Fig. 10-9. *Paphiopedilum hookerae* (Rchb. f. ex Honk. f.) Stein

种) (*Paphiopedilum* × *shipwayae* Rolfe) (in *Orchid Rev.* 6: 338. 1898) 发现于婆罗洲。此外, 至今该种之下已知有2个分类群: 卧氏兜兰 (变种) *P. hookerae* var. *volonteanum* (Sander ex Rolfe) Braem (1988) (basionym: *Cypripedium volonteanum*; syn.: *Paphiopedilum volonteanum*) 和素心变型 f. *sandowii* (Braem) Gruss (1998)。前者产婆罗洲, 其区别点为叶较狭, 背面有紫点, 花瓣较宽, 唇瓣在口部下方稍收缩; 后者为白化变型, 它原来是作为 *P. volonteanum* 的一个变型发表的。

Leaves 5–6, oblong-elliptic, 7–23 cm long, 2.7–5 cm wide, adaxially conspicuously tessellated with dark and light green, abaxially pale green. Scape up to 50 cm long, pale purple-brown, grayish-hairy; bract ovate-lanceolate, 2–3 cm long, green or pale purple-brown, hairy; pedicel and ovary ca. 5 cm long, green, hairy; flower single, 8–10 cm across; dorsal sepal and synsepal green, with yellowish-white or pale yellow-green margins, darker-veined; petals green, purple-red on margins and in apical one third, blackish-spotted in basal two thirds; lip pale green below the middle, purple-brown above; staminode purple-red, green-yellow or pale yellow centrally; dorsal sepal ovate or broadly ovate, 3–4 cm long, 2.3–2.9 cm wide; synsepal elliptic, conspicuously smaller than dorsal sepal; petals spatulate, 4–5.5 cm long, 1.5–2.2 cm wide, ciliate; lip helmet-shaped, brown-warted on its incurved side-lobes; pouch subellipsoid, 2.6–3.1 cm long, 1.7–2 cm wide, slightly auriculate on both sides of its mouth; staminode suborbicular, ca. 1 cm long and wide, with a sinus apically. $2n=28$.

Flowering period: March and April in the wild.

Distribution: Brunei Darussalam, Indonesia (Kalimantan), Malaysia (Sarawak).

Note: *Paphiopedilum* × *shipwayae* Rolfe (in *Orchid Rev.* 6: 338. 1898), a natural hybrid between this species and *P. dayanum*, was described from Borneo. In addition, two infraspecific taxa have been recognized: *P. hookerae* var. *volonteanum* (Sander ex Rolfe) Braem (1988) (basionym: *Cypripedium volonteanum*; syn.: *Paphiopedilum volonteanum*) and f. *sandowii* (Braem) Gruss (1998). The former is a native of Borneo, which differs from the typical variety (*P. hookerae* var. *hookerae*) in having narrower leaves purple-spotted abaxially, broader petals and the lip slightly constricted below the mouth; and the latter is an albino form, which was originally treated as a form of *P. volonteanum*.

10. 桑氏兜兰 (图10-10) (Fig. 10-10)

Paphiopedilum sangii Braem in Die Orchidee 38 (4): 169. 1987.

叶4—5枚，矩圆状披针形，长达28 cm，宽5.2 cm，上面有暗绿色与浅灰绿色相间的网格斑，背面浅绿色并在近基部具浅紫色斑。花葶长达30 cm，暗褐色，被毛；苞片椭圆形，长约2.5 cm，黄绿色，有紫斑；花梗和子房长达5.5 cm，暗褐色，被毛；花单朵；中萼片苹果绿色，具暗绿色脉，近基部有紫褐色脉；合萼片黄绿色；花瓣紫红色或下半部浅黄绿色，有深色脉；唇瓣橄榄绿色，有暗绿色脉，在近囊口周围稍有浅紫红色晕；退化雄蕊黄绿色；中萼片椭圆形，长4.3—6.1 cm，宽约3.3 cm，两面被短柔毛；合萼片椭圆形，明显小于中萼片；花瓣向下弯垂，倒披针形，长4.6—5.3 cm，宽1.4—2 cm，上侧边缘波状，近基部有长缘毛；唇瓣盔状；囊瓮状，长约3.5 cm，宽1.9 cm，囊口两侧略呈耳状；退化雄蕊倒心形，长约1.2 cm，宽1.4 cm，先端具缺刻。 $2n=28$ 。

花期：园中栽培为11月至翌年4月。

分布：印度尼西亚（苏拉威西）。

说明：在2006年发表了该种的一个变种*P. sangii* var. *ayubianum* Gruss & Roeth。它与桑氏兜兰的区别在于花瓣几乎平展，呈暗褐色；唇瓣较狭窄，近矩圆形。

Leaves 4–5, oblong-lanceolate, to 28 cm long, 5.2 cm wide, adaxially tessellated with dark green and grayish-green, abaxially pale green marked with pale purple toward the base. Scape to 30 cm long, dark brown, hairy; bract elliptic, ca. 2.5 cm long, yellow-green, marked with purple; pedicel and ovary to 5.5 cm long, dark brown, hairy; flower single; dorsal sepal apple-green, darker-veined, with purple-brown veins toward the base; synsepal yellow-green; petals purple-red or in basal half pale yellow-green, with darker veins; lip olive-green, with dark green veins, slightly flushed with pale purple-red around the mouth; staminode yellow-green; dorsal sepal elliptic, 4.3–6.1 cm long, ca. 3.3 cm wide, pubescent on both surfaces; synsepal elliptic, conspicuously smaller than dorsal sepal; petals deflexed-pendulous, oblanceolate, 4.6–5.3 cm long, 1.4–2 cm wide, undulate-margined on upper side, long-ciliate along basal margins; lip helmet-shaped; pouch urn-shaped, ca. 3.5 cm long, 1.9 cm wide, slightly auriculate on both sides of its mouth; staminode obcordate, ca. 1.2 cm long, 1.4 cm wide, incised apically. $2n=28$.

Flowering period: November to April in cultivation.

Distribution: Indonesia (Sulawesi).

Note: A variety of this species, *P. sangii* var. *ayubianum* Gruss & Roeth, was described in 2006, which differs from the typical variety in its almost horizontally spreading petals flushed with dark brown, and narrower suboblong lip.

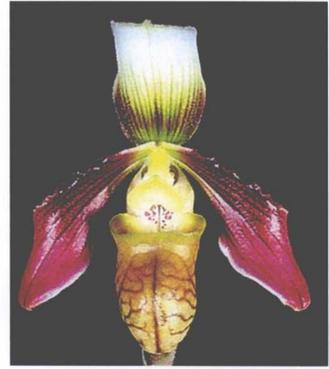


图 10-10. 桑氏兜兰
Fig. 10-10. *Paphiopedilum sangii* Braem

11. 马氏兜兰 (图10-11) (Fig. 10-11)

Paphiopedilum mastersianum (Rchb. f.) Stein, Orchideenbuch: 477. 1892.

Cypripedium mastersianum Rchb. f. in Gard. Chron. ser. 2, 12: 102. 1879.

Paphiopedilum mastersianum (Rchb. f.) Pfitzer

Cordula mastersiana (Rchb. f.) Rolfe

叶4—6枚, 狭矩圆状椭圆形, 长18—30 cm, 宽3.5—4.5 cm, 上面有深浅绿色相间的网格斑, 背面浅绿色, 先端常具3小齿。花葶长15—40 cm, 紫色, 被长硬毛; 苞片卵状椭圆形, 长2—2.9 cm, 暗绿色; 花梗和子房长5.5—9.5 cm, 绿色, 具紫色纵肋, 肋上被毛; 花单朵, 直径9—12 cm; 中萼片亮绿色, 具暗色脉, 边缘黄白色; 合萼片浅绿黄色; 花瓣下半部通常浅绿色并有浅黑栗色斑点, 上半部紫色或浅褐色, 有时有不同程度的黑褐色晕; 唇瓣浅褐色, 有暗色脉, 内弯侧裂片上有紫褐色斑点; 退化雄蕊深绿色或绿褐色, 具浅黄色边缘; 中萼片宽卵形, 长3—4 cm, 宽3.2—4.5 cm, 背面被短柔毛; 合萼片与中萼片相似, 但较小; 花瓣近匙形的矩圆形, 长4.5—6 cm, 宽1.3—2 cm; 唇瓣盔状; 囊近椭圆形, 长3.5—4 cm, 宽2.5—3 cm, 囊口两侧几乎不呈耳状; 退化雄蕊略似马蹄形, 长、宽各8—10 mm, 先端具弯缺。2n=32, 36, 40。

花期: 野外为7—9月或1—3月。

分布: 印度尼西亚 (摩洛加群岛)。

说明: 该种的变种: 摩氏兜兰 (变种) *P. mastersianum* var. *mohrianum* (Braem)



图 10-11. 马氏兜兰

Fig. 10-11. *Paphiopedilum mastersianum* (Rchb. f.) Stein

Koop. (2000) 产于印度尼西亚的 Flores 岛。它是 1989 年由 Braem 作为独立的种发表的, 但 P. J. Cribb (1998) 却认为是印尼兜兰 (变种) (*P. bullenianum* var. *celesbesense*) 和爪哇兜兰 (*P. javanicum*) 之间的天然杂种, 称之为 *Paphiopedilum* × *mohrianum* (Braem) P. J. Cribb.

Leaves 4—6, narrowly oblong-elliptic, 18—30 cm long, 3.5—4.5 cm wide, adaxially tessellated with deep and light green, abaxially pale green, often tridenticulate apically.

Scape 15—40 cm long, purple, hirsute; bract ovate-elliptic, 2—2.9 cm long, dark green; pedicel and ovary 5.5—9.5 cm long, green, longitudinal-ribbed; ribs purple, hairy; flower single, 9—12 cm across; dorsal sepal bright green, with darker veins, margins yellowish-white; synsepal pale green-yellow; petals often pale green and spotted with black-maroon in basal half, purple or pale brown in apical half, sometimes flushed to varying degrees with

black-brown; lip pale brown, darker-veined, spotted with purple-brown on incurved side-lobes; staminode deep green or green-brown, pale yellow on margins; dorsal sepal broadly ovate, 3–4 cm long, 3.2–4.5 cm wide, abaxially pubescent; synsepal similar to dorsal sepal, but smaller; petals subspatulate-oblong, 4.5–6 cm long, 1.3–2 cm wide; lip helmet-shaped; pouch subellipsoid, 3.5–4 cm long, 2.5–3 cm wide, scarcely auriculate on both sides of its mouth; staminode somewhat horseshoe-shaped, 8–10 mm long and wide, with a sinus apically. $2n=32, 36, 40$.

Flowering period: July to September or January to March in the wild.

Distribution: Indonesia (Moluccas Islands).

Note: *P. mastersianum* var. *mohrianum* (Braem) Koop. (2000) is a native of Flores (Indonesia). It was published by Braem in 1989 as a distinct species, but P. J. Cribb (1998) considered it to be a natural hybrid of *P. bullenianum* var. *celebesense* and *P. javanicum*, called *Paphiopedilum* × *mohrianum* (Braem) P. J. Cribb.

12. 巴布亚兜兰 (图10-12) (Fig. 10-12)

Paphiopedilum papuanum (Ridl. ex Rendle) L. O. Williams in Bot. Mus. Leafl. 12: 149. 1946.

Cypripedium papuanum Ridl. ex Rendle in Gard. Chron. ser. 3, 58: 131. 1915.

Paphiopedilum zieckianum Schoser

叶4—6枚, 近矩圆形或矩圆状椭圆形, 长7—12 (—22) cm, 宽2—4.2 cm, 上面具深浅绿色相间的网格斑, 背面浅绿色, 先端近急尖。花葶长20—30 cm, 浅紫红色, 被短柔毛; 苞片卵形, 长1.2—1.5 cm, 被毛; 花梗和子房长约5 cm, 深绿色, 被毛; 花单朵, 直径6—9 cm; 中萼片与合萼片绿色, 具紫红色脉, 边缘白色; 花瓣上半部暗栗色, 下半部浅黄色并有黑色斑点; 唇瓣暗红色或浅褐色而有暗红色脉; 退化雄蕊浅黄



图 10-12. 巴布亚兜兰

Fig. 10-12. *Paphiopedilum papuanum* (Ridl. ex Rendle) L. O. Williams

色, 有时有2个绿色斑块; 中萼片宽卵形, 长2.4—2.6 cm, 宽1.8—2.6 cm, 背面被短柔毛; 合萼片椭圆状披针形, 明显小于中萼片; 花瓣近矩圆状匙形, 长4—4.3 cm, 宽1.2—1.7 cm, 下部边缘波状, 具细缘毛; 唇瓣盔状; 囊卵形, 长2—2.5 cm, 宽约1.4 cm, 囊口两侧稍呈耳状; 退化雄蕊新月状肾形, 长4—5 mm, 宽约6 mm, 先端有缺刻。

花期: 野外为3—4月。

分布: 新几内亚岛。

Leaves 4–6, suboblong or oblong-elliptic, 7–12(–22) cm long, 2–4.2 cm wide, adaxially tessellated with dark and light green, abaxially pale green, subacute at apex. Scape 20–30 cm long, pale purple-red, pubescent; bract ovate, 1.2–1.5 cm long, hairy; pedicel and ovary ca. 5 cm long, deep green, hairy; flower single, 6–9 cm across; dorsal sepal and synsepal green, veined with purple-red, white-margined; petals dark maroon in apical half, pale yellow and black-spotted in basal half; lip dull red or pale brown, veined with dark red; staminode pale yellow, sometimes with 2 green blotches; dorsal sepal broadly ovate, 2.4–2.6 cm long, 1.8–2.6 cm wide, abaxially pubescent; synsepal elliptic-lanceolate, conspicuously smaller than dorsal sepal; petals suboblong-spatulate, 4–4.3 cm long, 1.2–1.7 cm wide, undulate-margined in basal half, minutely ciliate; lip helmet-shaped; pouch ovoid, 2–2.5 cm long, ca. 1.4 cm wide, slightly auriculate on both sides of its mouth; staminode lunate-reniform, 4–5 mm long, ca. 6 mm wide, notched apically.

Flowering period: March and April in the wild.

Distribution: New Guinea Island.

13. 布干岛兜兰 (图10-13) (Fig. 10-13)

Paphiopedilum bougainvillanum Fowlie in *Orchid Digest* 35: 122. 1971.

Paphiopedilum violascens Schltr. var. *bougainvillanum* (Fowlie) Koop.

叶5—7枚，狭椭圆形，长14—25 cm，宽2.5—4.2 cm，上面略有绿色与浅绿色相间的网格斑，背面浅绿色，近先端边缘啮蚀状。花葶长10—25 cm，浅绿色，被紫毛；苞片椭圆形，长2—2.6 cm，浅绿色，被毛；花梗和子房长约4 cm，绿色，被紫色短柔毛；花单朵，直径约5 cm，白色至绿白色，具绿色脉纹；中萼片宽卵形，长3.1—3.8 cm，宽3.2—4 cm，先端急尖；合萼片卵形，小于中萼片；花瓣狭矩圆形或狭椭圆形，稍呈镰刀状，向下弯垂，长4.5—5 cm，宽1.5—2 cm，具细缘毛；唇瓣盔状；囊卵形，长2.5—3.5 cm，宽1.7—2.7 cm，囊口两侧略呈耳状；退化雄蕊新月形，长8—10 mm，宽12—14 mm，上面有微柔毛。2*n*=40。

花期：野外为晚春和晚秋。

分布：巴布亚新几内亚（布干维尔）。

说明：该种的变种沙氏兜兰（变种）（*P. bougainvillanum* var. *saskianum* Gruss & Roeth (1999)）与原变种（var. *bougainvillanum*）的区别在于前者具有浅褐色的唇瓣和仅仅稍下弯的花瓣，而且花瓣中脉的上侧呈黑褐色。

Leaves 5–7, narrowly elliptic, 14–25 cm long, 2.5–4.2 cm wide, adaxially slightly tessellated with green and light green, abaxially pale green, erose-margined toward the apex. Scape 10–25 cm long, pale green, purple-hairy; bract elliptic, 2–2.6 cm long, pale green, hairy; pedicel and ovary ca. 4 cm long, green, purple-pubescent; flower single, ca. 5 cm across, white to greenish-white, with green veins; dorsal sepal broadly ovate, 3.1–3.8 cm long, 3.2–4 cm wide, acute at apex; synsepal ovate, smaller than dorsal sepal; petals narrow-oblong or narrow-elliptic, slightly falcate, deflexed-pendent, 4.5–5 cm long, 1.5–2 cm wide, minutely ciliate; lip helmet-shaped; pouch ovoid, 2.5–3.5 cm long, 1.7–2.7 cm wide, slightly auriculate on both sides of its mouth; staminode lunate, 8–10 mm long, 12–14 mm wide, adaxially puberulous. 2*n*=40.

Flowering period: Late spring or late autumn in the wild.

Distribution: Papua New Guinea (Bougainville).

Note: Its variety, *P. bougainvillanum* var. *saskianum* Gruss & Roeth (1999), differs from the typical variety (var. *bougainvillanum*) in its pale brown lip and only slightly deflexed petals flushed with black-brown on upper side of the midvein.



图10-13. 布干岛兜兰
Fig. 10-13. *Paphiopedilum bougainvillanum* Fowlie

14. 青紫兜兰 (图10-14) (Fig. 10-14)

Paphiopedilum violascens Schltr. in Repert. Spec. Nov. Regni Veg. Beih. 1: 2. 1911.

Cordula violascens (Schltr.) Rolfe

Paphiopedilum violascens var. *gautierense* J. J. Smith

叶4—6枚，近矩圆形，长8—22 cm，宽2.3—4 cm，上面有深浅绿色相间的网格斑，背面浅绿色，先端纯并具3小齿。花葶长20—30 cm，紫褐色，被毛；苞片卵状披针形，长1.5—2.4 cm，被短柔毛；花梗和子房长4—6.8 cm，绿色，被紫色短柔毛；花单朵或罕有2朵，直径6—7 cm；中萼片白色，有绿色脉和浅紫色晕；合萼片绿色，有暗色脉；花瓣白色至绿白色，有浓密的紫色晕和紫色脉；唇瓣橄榄绿，有深色脉，有时有浅褐色晕；退化雄蕊浅绿黄色，中央有绿色斑纹；中萼片宽卵形，长2.7—3.2 cm，宽2.8—3 cm，背面被微柔毛；合萼片椭圆状卵形，小于中萼片；花瓣下弯，狭矩圆形，



图10-14. 青紫兜兰
Fig. 10-14. *Paphiopedilum violascens* Schltr.

长3.5—4.6 cm，宽1.5—1.8 cm，边缘具缘毛；唇瓣盔状；囊椭圆状卵形，长2.5—3 cm，宽约2 cm，囊口两侧略呈耳状；退化雄蕊略呈倒心状肾形，长7—8 mm，宽1.3—1.4 cm，先端有弯缺，弯缺中央具1枚小齿。2n=38。

花期：野外为5—6月或10—12月。

分布：新几内亚岛及其北面小岛。

Leaves 4–6, suboblong, 8–22 cm long, 2.3–4 cm wide, adaxially tessellated with dark and light green, abaxially pale green, obtuse and tridenticulate at apex. Scape 20–30 cm long, purple-brown, hairy; bracts ovate-lanceolate, 1.5–2.4 cm long, pubescent; pedicel and ovary 4–6.8 cm long, green, purple-pubescent; flowers single or rarely two, 6–7 cm across; dorsal sepal white, veined with green and flushed with pale purple; synsepal green, with darker veins; petals white to greenish-white, heavily flushed and veined with purple; lip olive-green, with deeper veins, sometimes flushed with pale brown; staminode pale green-yellow, with green veins centrally; dorsal sepal broadly ovate, 2.7–3.2 cm long, 2.8–3 cm wide, abaxially puberulous; synsepal elliptic-ovate, smaller than dorsal sepal; petals deflexed, narrowly oblong, 3.5–4.6 cm long, 1.5–1.8 cm wide, ciliate; lip helmet-shaped; pouch ellipsoid-ovoid, 2.5–3 cm long, ca. 2 cm wide, slightly auriculate on both sides of its mouth; staminode somewhat obcordate-reniform, 7–8 mm long, 1.3–1.4 cm wide, with a sinus apically and a central tooth in it. 2n=38.

Flowering period: May and June or October to December in the wild.

Distribution: New Guinea and adjacent islands near northern coast.

15. 所罗门兜兰 (图10-15) (Fig. 10-15)

Paphiopedilum wentworthianum Schoser & Fowlie in *Orchid Digest* 32: 285. 1968.

叶4—6枚，狭矩圆形或椭圆状矩圆形，长12—26 cm，宽3.5—4.5 cm，上面有深浅绿色相间的网格斑，背面浅绿色。花葶长10—35 cm，紫色，被短柔毛；苞片椭圆状卵形，长1.5—2.5 cm，被短柔毛；花梗和子房长4—5.5 cm，密被短柔毛；花单朵，直径8—8.5 cm；中萼片浅绿色，有绿色和浅褐色脉，具绿白色边缘，在中央和下半部常有褐色晕；合萼片乳黄色，有绿色脉；花瓣上部浅紫色，下部多少有褐色和绿色晕；唇瓣黄绿色，有褐色晕和深色脉纹；退化雄蕊绿黄色，有浅褐色晕；中萼片宽卵形，长2.8—3.3 cm，宽2.5—3.5 cm，先端钝，近无毛；合萼片卵形，小于中萼片；花瓣近矩圆形，长4.1—4.5 cm，宽1.5—2.5 cm，上侧边缘波状，有缘毛；唇瓣盔状；囊卵形，长2.5—3 cm，宽2—2.3 cm，囊口两侧几乎不呈耳状；退化雄蕊新月形，长8—10 mm，宽11—12 mm，上面被微柔毛。 $2n=40$ 。

花期：野外为夏季。

分布：巴布亚新几内亚（布干维尔）、所罗门群岛（瓜达尔卡纳尔）。

Leaves 4–6, narrowly oblong or elliptic-oblong, 12–26 cm long, 3.5–4.5 cm wide, adaxially tessellated with deep and light green, abaxially pale green. Scape 10–35 cm long, purple, pubescent; bract elliptic-ovate, 1.5–2.5 cm long, pubescent; pedicel and ovary 4–5.5 cm long, densely pubescent; flower single, 8–8.5 cm across; dorsal sepal pale green, veined with green and pale brown, green-white-margined, often flushed with brown centrally and in lower half; synsepal cream, veined with green; petals pale purple in upper part, more or less flushed with brown and green in lower part; lip yellow-green, flushed with brown, darker-veined; staminode green-yellow, flushed with pale brown; dorsal sepal broadly ovate, 2.8–3.3 cm long, 2.5–3.5 cm wide, obtuse at apex, subglabrous; synsepal ovate, smaller than dorsal sepal; petals suboblong, 4.1–4.5 cm long, 1.5–2.5 cm wide, undulate along the margin of the upper side, ciliate; lip helmet-shaped; pouch ovoid, 2.5–3 cm long, 2–2.3 cm wide, scarcely auriculate on both sides of its mouth; staminode lunate, 8–10 mm long, 11–12 mm wide, adaxially puberulous. $2n=40$.

Flowering period: Summer in the wild.

Distribution: Papua New Guinea (Bougainville) and Solomon Islands (Guadalcanal).



图 10-15. 所罗门兜兰

Fig. 10-15. *Paphiopedilum wentworthianum* Schoser & Fowlie

16. 洁净兜兰 (图10-16) (Fig. 10-16)

Paphiopedilum tonsum (Rchb. f.) Stein, Orchideenbuch: 488. 1892; P. J. Cribb in Curtis's Bot. Mag. 184: t. 838. 1982.

Cypripedium tonsum Rchb. f. in Gard. Chron. n. s., 20: 262. 1883.

Cordula tonsa (Rchb. f.) Rolfe

叶5—7枚, 狭矩圆形, 长约20 cm, 宽4.5—5 cm, 上面有深浅绿色相间的网格斑, 背面布满浅紫褐色斑。花葶长35—40 cm, 暗绿色, 具密集的紫色斑点, 被短毛; 苞片卵形, 长1.8—2.4 cm, 背面被毛; 花梗与子房长达6 cm, 稍被毛; 花单朵, 直径10—12 (—14) cm; 中萼片绿色至浊粉红色, 有暗色脉, 通常具宽阔的白色边缘; 合萼片浅绿色, 具暗绿色脉; 花瓣绿色, 有暗色脉, 常有浅褐色晕, 上面有少数黑色疣点; 唇瓣浅褐色或绿褐色, 有暗色脉; 退化雄蕊浅黄褐色; 中萼片宽倒卵形, 长4.5—5 cm, 宽约4 cm; 合萼片近椭圆形, 明显狭窄于中萼片; 花瓣矩圆状匙形, 长约6.5 cm, 宽2 cm; 唇瓣盔状; 囊近卵形, 长3—3.5 cm, 宽2.5—3 cm, 囊口两侧略呈耳状; 退化雄蕊近肾形, 长10—11 mm, 宽13—14 mm, 先端具缺刻。2n=32, 34。

花期: 野外为3—6月。

分布: 印度尼西亚 (苏门答腊)。

说明: 该种的变种 *P. tonsum* var. *braemii* (H. Mohr) Gruss (1994) (基名: *P. braemii* H. Mohr.) [in *Orchideeën* 51 (6): 175. 1989] 亦产于苏门答腊, 与原变种 (*P. tonsum* var. *tonsum*) 的区别在于花较小, 较绿, 花瓣上有更多的黑色疣点。此外, 在1998年发表了该种的一个白化型, 即白绿变型 (f. *alboviride* Braem)。

该种与华丽兜兰的变种克氏兜兰 (变种) (*P. superbiens* var. *curtisii*) 之间的天

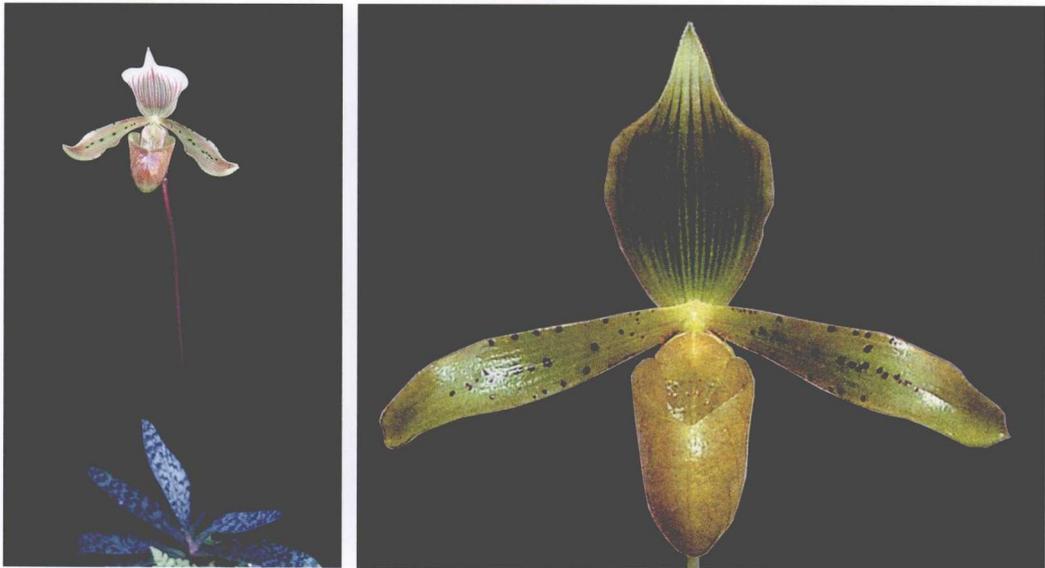


图 10-16. 洁净兜兰

Fig. 10-16. *Paphiopedilum tonsum* (Rchb. f.) Stein

然杂种：佛朗兜兰（杂种）（*Paphiopedilum* × *frankeanum* Rolfe）（in *Orchid Rev.* 16: 29. 1908）也产于印度尼西亚。

Leaves 5–7, narrowly oblong, ca. 20 cm long, 4.5–5 cm wide, adaxially tessellated with dark and light green, abaxially heavily mottled with pale purple-brown. Scape 35–40 cm long, dark green, densely purple-spotted, short-hairy; bract ovate, 1.8–2.4 cm long, abaxially hairy; pedicel and ovary to 6 cm long, slightly hairy; flower single, 10–12 (–14) cm across; dorsal sepal green to dull pink, with darker veins, often broadly white-margined; synsepal pale green, with dark green veins; petals green, with darker veins, often flushed with pale brown, adaxially with a few black warts; lip pale brown or green-brown, with darker veins; staminode pale yellow-brown; dorsal sepal broadly obovate, 4.5–5 cm long, ca. 4 cm wide; synsepal subelliptic, conspicuously narrower than dorsal sepal; petals oblong-spatulate, ca. 6.5 cm long, 2 cm wide; lip helmet-shaped; pouch subovoid, 3–3.5 cm long, 2.5–3 cm wide, slightly auriculate on both sides of its mouth; staminode subreniform, 10–11 mm long, 13–14 mm wide, incised apically. $2n=32, 34$.

Flowering period: March to June in the wild.

Distribution: Indonesia (Sumatra).

Note: Its variety, *P. tonsum* var. *braemii* (H. Mohr) Gruss (1994) (basonym: *P. braemii* H. Mohr.) [in *Orchideeën* 51 (6): 175. 1989], is also found in Sumatra, differing from the typical variety, *P. tonsum* var. *tonsum*, in having a smaller and rather green flower with more black warts on its petals. Besides, an albino form, f. *alboviride* Braem, was described in 1998.

Paphiopedilum × *frankeanum* Rolfe (in *Orchid Rev.* 16: 29. 1908), a natural hybrid of this species and *P. superbiens* var. *curtisii*, is also found in Indonesia.

17. 斑瓣兜兰 (图10-17) (Fig. 10-17)

Paphiopedilum argus (Rchb. f.) Stein, Orchideenbuch: 453. 1892.

Cypripedium argus Rchb. f. in Gard. Chron.: 608. 1873.

Cypripedium pitcherianum Manda

Paphiopedilum argus (Rchb. f.) Pfitzer

Cordula argus (Rchb. f.) Rolfe

Paphiopedilum sriwananum Koop.

Paphiopedilum argus var. *sriwananum* (Koop.) Gruss

叶3—5枚, 狭椭圆形, 长9—24 cm, 宽2—4.5 cm, 上面有深浅绿色相间的网格斑, 背面浅绿色并在基部稍具紫色斑。花葶长30—45 cm, 浅紫褐色, 被短毛; 苞片椭圆状卵形, 长2—4.5 cm, 宽1.5—1.8 cm, 绿色; 花梗和子房长5—8 cm, 绿色, 稍被毛; 花单朵, 直径6—8 cm; 中萼片白色, 具绿色脉, 近基部常有紫色斑点; 合萼片白色, 有绿色脉; 花瓣白色, 具绿色脉, 近先端有紫色条纹或晕, 具密集的黑色疣状斑点; 唇瓣下部绿色并有深色脉, 上部紫褐色, 内弯的侧裂片上有黑紫色斑点; 退化雄蕊浅褐绿色或浅黄绿色, 中央有深绿色脉纹; 中萼片宽卵形, 长3.4—4.7 cm, 宽3—3.9 cm; 合萼片近卵形, 明显小于中萼片; 花瓣近狭矩圆形, 长4.5—6 cm, 宽1.1—1.8 cm, 边缘具长缘毛; 唇瓣盔状; 囊近椭圆形, 长2.5—3 cm, 宽2—2.5 cm, 囊口两侧稍呈耳状; 退化雄蕊近新月形, 长7—9 mm, 宽11—12 mm, 上面被微柔毛。2n=38。

花期: 野外为3—4月。



图 10-17. 斑瓣兜兰

Fig. 10-17. *Paphiopedilum argus* (Rchb. f.) Stein

分布：菲律宾（吕宋）。

Leaves 3–5, narrowly oblong, 9–24 cm long, 2–4.5 cm wide, adaxially tessellated with dark and light green, abaxially pale green and slightly purple-marked basally. Scape 30–45 cm long, pale purple-brown, shortly hairy; bract elliptic-ovate, 2–4.5 cm long, 1.5–1.8 cm wide, green; pedicel and ovary 5–8 cm long, green, slightly hairy; flower single, 6–8 cm across; dorsal sepal white, green-veined, often purple-spotted toward the base; synsepal white, green-veined; petals white, with green veins, striped and flushed with purple toward the apex, densely covered with wart-like spots; lip green and with darker veins in lower part, purple-brown in upper part, with black-purple spots on its incurved side-lobes; staminode pale green-brown or pale yellow-brown, with deep green veins centrally; dorsal sepal broadly ovate, 3.4–4.7 cm long, 3–3.9 cm wide; synsepal subovate, conspicuously narrower than dorsal sepal; petals narrowly suboblong, 4.5–6 cm long, 1.1–1.8 cm wide, long-ciliate; lip helmet-shaped; pouch subellipsoid, 2.5–3 cm long, 2–2.5 cm wide, slightly auriculate on both sides of its mouth; staminode sublunate, 7–9 mm long, 11–12 mm wide, adaxially puberulous. $2n=38$.

Flowering period: March and April in the wild.

Distribution: Philippines (Luzon).

18. 髯毛兜兰 (图10-18) (Fig. 10-18)

Paphiopedilum barbatum (Lindl.) Pfitzer in Jahrb. Wiss. Bot. 19: 159. 1888.

Cypripedium barbatum Lindl. in Bot. Reg. 27: misc. 53. 1841.

Cypripedium crossii Morren

Cypripedium biflorum B. S. Williams

Cypripedium nigratum Rchb. f.

Cypripedium warnerianum Rchb. f. ex Wittm.

Cypripedium barbatum var. *biflorum* (B. S. Williams) B. S. Williams

Paphiopedilum nigratum (Rchb. f.) Pfitzer

Paphiopedilum barbatum var. *nigratum* (Rchb. f.) Pfitzer

Cordula barbata (Rchb. f.) Rolfe

Cordula nigrita (Rchb. f.) Rolfe

Paphiopedilum crossii (Morren) Braem & Senghas

叶5—8枚，狭矩圆状椭圆形，长10—20 cm，宽3—4.1 cm，上面有深浅绿色相间的网格斑，背面浅绿色。花葶长25—40 cm，紫色，密被微柔毛；苞片卵形，长1.5—2.4 cm，绿色；花梗和子房长5—6.7 cm，浅绿色，具紫色纵肋；花单朵，罕有2朵，直径8—9 cm；中萼片白色，具紫色脉，基部略有浅绿色晕；合萼片浅黄绿色，具绿



图 10-18. 髯毛兜兰

Fig. 10-18. *Paphiopedilum barbatum* (Lindl.) Pfitzer

色脉；花瓣紫色至浅栗色，近基部下侧常色泽较浅并有深色脉，沿下半部上侧边缘具少数黑色疣状突起；唇瓣栗色至紫栗色；退化雄蕊浅绿黄色或浅褐色，有深绿色脉纹；中萼片宽卵形至近圆形，长4—5 cm，宽4.3—5.5 cm，背面被微柔毛；合萼片较中萼片小得多；花瓣狭矩圆形，长4—6 cm，宽1—1.6 cm，边缘有缘毛；唇瓣盔状；囊近卵形，长2.5—3 cm，宽2—2.5 cm，囊口两侧呈耳状；退化雄蕊近马蹄形，长、宽各10—11（—15）mm，先端弯缺中央具1齿。 $2n=38$ 。

花期：野外为6—7月和12月至翌年1月。

分布：印度尼西亚（苏门答腊）、马来西亚（马来半岛）、泰国。

说明：马来西亚产的麻氏兜兰（杂种）（*Paphiopedilum* × *mattesii* Pittenauer ex Roeth & Gruss）[in *Die Orchidee* 47(3):131. 1996]被认为是该种与布玲兜兰（*P. bullenianum*）之间的天然杂种。

Leaves 5–8, narrowly oblong-elliptic, 10–20 cm long, 3–4.1 cm wide, adaxially tessellated with dark and light green, abaxially pale green. Scape 25–40 cm long, purple, densely puberulous; bracts ovate, 1.5–2.4 cm long, green; pedicel and ovary 5–6.7 cm long, pale green, longitudinally purplish-ribbed; flowers single or rarely 2, 8–9 cm across; dorsal sepal white, veined with purple, slightly tinged with pale green toward its base; synsepal pale yellow-green, with green veins; petals purple to pale maroon, often paler and with darker veins on the lower side toward the base, with a few black warts toward upper margin in basal half; lip maroon to purple-maroon; staminode pale green-yellow or pale brown, with deep green veins; dorsal sepal broadly ovate to suborbicular, 4–5 cm long, 4.3–5.5 cm wide, abaxially puberulous; synsepal much smaller than dorsal sepal; petals narrowly oblong, 4–6 cm long, 1–1.6 cm wide, ciliate; lip helmet-shaped; pouch subovoid, 2.5–3 cm long, 2–2.5 cm wide, auriculate on both sides of its mouth; staminode horseshoe-shaped, 10–11(–15) mm long and wide, with a central tooth in apical sinus. $2n=38$.

Flowering period: June and July and again December and January in the wild.

Distribution: Indonesia (Sumatra), Malaysia (Malay Pen.), Thailand.

Note: *Paphiopedilum* × *mattesii* Pittenauer ex Roeth & Gruss [in *Die Orchidee* 47 (3): 131. 1996] was described from Malaysia, and considered to be a natural hybrid between this species and *P. bullenianum*.

19. 胼胝兜兰 (图10-19) (Fig. 10-19)

Paphiopedilum callosum (Rchb. f.) Stein, Orchideenbuch: 457. 1892.

Cypripedium callosum Rchb. f. in Gard. Chron. ser. 2, 26: 326. 1886.

Cypripedium barbatum (Lindl.) Pfitzer var. *warnerianum* T. Moore

Cypripedium callosum var. *sublaeve* Rchb. f.

Cypripedium schmidtianum Kraenzl.

Paphiopedilum callosum var. *schmidtianum* (Kraenzl.) Pfitzer

Cordula callosa (Rchb. f.) Rolfe

Paphiopedilum callosum var. *angustipetalum* Guill.

Paphiopedilum callosum subsp. *sublaeve* (Rchb. f.) Fowlie

Paphiopedilum sublaeve (Rchb. f.) Fowlie

Paphiopedilum callosum var. *sublaeve* (Rchb. f.) P. J. Cribb

Paphiopedilum crossii var. *sublaeve* (Rchb. f.) Braem & Senghas

叶3—5枚，狭椭圆形，长10—25 cm，宽3—5 cm，上面有深浅绿色相间的网格斑，背面浅绿色或有时基部有紫斑。花葶长20—40 cm，紫色，被短柔毛；苞片近卵形，长1.5—2.8 cm，绿色；花梗和子房长3—6.5 cm，绿色至浅紫色，被短柔毛；花单朵或罕有2朵，直径8—11 cm；中萼片与合萼片白色，有紫色晕，具绿色与紫色脉；



图 10-19. 胼胝兜兰

Fig. 10-19. *Paphiopedilum callosum* (Rchb. f.) Stein

花瓣黄绿色，具暗色脉，先端1/3处有浅玫瑰紫色晕，上侧边缘有少数黑色疣状突起；唇瓣深栗色至铜褐色；退化雄蕊浅黄绿色，有深绿色或紫色脉纹；中萼片横椭圆形或宽卵形，长3.4—5.5 cm，宽3—7 cm；合萼片明显小于中萼片；花瓣狭矩圆形，长4—6.8 cm，宽1.2—1.6 cm，有栗色缘毛；唇瓣盔状，内弯的侧裂片上具疣点；囊近卵形，长2.5—3.5 cm，宽2—2.5 cm，囊口两侧稍呈耳状；退化雄蕊近马蹄形，长10—11 mm，宽7—8 mm。2n=32。

花期：园中栽培为春、夏季。

分布：柬埔寨、老挝、马来西亚、缅甸、泰国、越南。

说明：该种和卷萼兜兰 (*P. appletonianum*) 之间的天然杂种：暹罗兜兰 (杂种) [*Paphiopedilum* × *siamense* (Rolfe) Rolfe] (in *Orchid Rev.* 4: 366, 1896) 发现于泰国；该种与紫毛兜兰 (*P. villosum*) 之间的天然杂种：打拉兜兰 (杂种) *Paphiopedilum* × *dalatense* Aver. [in *Orchid Digest* 65 (3): 133, 2001] 发现于越南南部。此外，根据花的色泽不同，还建立了一些种下等级，如暗紫变种 (var. *viniferum*) 和绿花变型 (f. *viridiflorum*) 等。它们曾一度被 Braem & Chiron (2003) 置于 *P. crossii* 之下作为变型，现应移于 *P. callosum* 之下。

Leaves 3–5, narrowly elliptic, 10–25 cm long, 3–5 cm wide, adaxially tessellated with dark and light green, abaxially pale green and sometimes purple-marked basally. Scape 20–40 cm long, purple, pubescent; bracts subovate, 1.5–2.8 cm long, green; pedicel and ovary 3–6.5 cm long, green to pale purple, pubescent; flowers single or rarely 2, 8–11 cm across; dorsal sepal and synsepal white, flushed with purple, veined with green and purple; petals yellow-green, with darker veins, flushed with pale rose-purple in apical one third, with a few black warts on the margin of the upper side; lip deep maroon to bronze-brown; staminode pale yellow-green, veined with deep green or purple; dorsal sepal transversely elliptic to broadly ovate, 3.4–5.5 cm long, 3–7 cm wide; synsepal much smaller than dorsal sepal; petals narrowly oblong, 4–6.8 cm long, 1.2–1.6 cm wide, maroon-ciliate; lip helmet-shaped, warty on its incurved side-lobes; pouch subovoid, 2.5–3.5 cm long, 2–2.5 cm wide, slightly auriculate on both sides of its mouth; staminode nearly horseshoe-shaped, 10–11 mm long, 7–8 mm wide. 2n=32.

Flowering period: Spring and Summer in cultivation.

Distribution: Cambodia, Laos, Malaysia, Myanmar, Thailand, Vietnam.

Note: *Paphiopedilum* × *siamense* (Rolfe) Rolfe (in *Orchid Rev.* 4: 366, 1896) described from Thailand is a natural hybrid between this species and *P. appletonianum*; and *Paphiopedilum* × *dalatense* Aver. [in *Orchid Digest* 65(3): 133, 2001], a natural hybrid between this species and *P. villosum*, was found in southern Vietnam. Besides, based on floral coloration, several infraspecific taxa have been proposed, such as var. *viniferum* and f. *viridiflorum*. They were once treated by Braem & Chiron (2003) as forms of *P. crossii*, and now should be transferred to *P. callosum*.

20. 朴氏兜兰 (图10-20) (Fig. 10-20)

Paphiopedilum potentianum Gruss & Roeth in Caesiana 5: 39. 1995.

Paphiopedilum callosum (Rchb. f.) Stein var. *potentianum* (Gruss & Roeth) P. J. Cribb

Paphiopedilum crossii (Morren) Braem & Senghas var. *potentianum* (Gruss & Roeth)
Braem & Senghas

叶数枚，狭椭圆形，长约15 cm，宽4 cm，上面具深浅绿色相间的网格斑，背面浅绿灰色。花葶长约25 cm，绿色，被浅褐紫色毛；苞片长约2 cm，被白毛；花单朵；中萼片白色，具12—18条绿色或浅褐色纵条纹；合萼片亦为白色，具8条绿色或浅褐色纵条纹；花瓣橄榄绿色，有浅红褐色晕，具暗色或深绿色纵脉；唇瓣浅红褐色，下部有时浅绿色，有暗色脉；退化雄蕊绿白色，中央有深绿色脉纹；中萼片椭圆形，长4—5.5 cm，宽1.9—2.6 cm；合萼片长约3.7 cm，宽1 cm；花瓣狭矩圆形，长约5.5 cm，宽1.1 cm，边缘有长缘毛；唇瓣盔状，内弯的侧裂片上具暗褐红色疣点；囊近卵形，长约3.8 cm，囊口两侧稍呈耳状；退化雄蕊近马蹄形，长约1 cm，宽1.1 cm。

花期：园中栽培为4月。

分布：泰国。



图 10-20. 朴氏兜兰

Fig. 10-20. *Paphiopedilum potentianum* Gruss & Roeth

Leaves several, narrowly elliptic, ca. 15 cm long, 4 cm wide, adaxially tessellated with dark and light green, abaxially pale green-grey. Scape ca. 25 cm long, green, covered with brown-violet hairs; bract ca. 2 cm long, white-hairy; flower single; dorsal sepal white, with 12–18 green or pale brown longitudinal stripes; synsepal white, with 8 green or pale brown longitudinal stripes; petals olive-green, tinged with pale red-brown, longitudinally veined

with darker or deep green; lip pale red-brown, lower part sometimes pale green, darker-veined; staminode green-whitish, with dark green veins centrally; dorsal sepal elliptic, 4–5.5 cm long, 1.9–2.6 cm wide; synsepal ca. 3.7 cm long, 1 cm wide; petals narrowly oblong, ca. 5.5 cm long, 1.1 cm wide, long-ciliate; lip helmet-shaped, with dark brown-red warts on its incurved side lobes; pouch subovoid, ca. 3.8 cm long, slightly auriculate on both sides of its mouth; staminode nearly horseshoe-shaped, ca. 1 cm long, 1.1 cm wide.

Flowering period: April in cultivation.

Distribution: Thailand.

21. 恒氏兜兰 (图10-21) (Fig. 10-21)

Paphiopedilum hennisianum (M. W. Wood) Fowlie in Orchid Digest 41: 60. 1977.

Paphiopedilum barbatum (Lindl.) Pfitzer subsp. *lawrenceanum* (Rchb. f.) M. W. Wood var. *hennisianum* M. W. Wood in Orchid Rev. 84: 352. 1976.

叶4—6枚，狭椭圆形或狭矩圆形，长14—18 cm，宽3—4 cm，上面有深浅绿色相间的网格斑，背面浅绿色。花葶长22—32 cm，浅紫色，被短柔毛；苞片卵形，长1.4—2.4 cm，绿色，具短柔毛；花梗和子房长4—7 cm，绿色，被毛；花单朵，直径7.5—8.5 cm；萼片与花瓣白色，具绿色或紫绿色脉；唇瓣浅紫褐色，有绿色晕和深色脉纹；退化雄蕊绿白色或浅绿黄色，有绿色脉纹；中萼片宽卵形或近圆形，长3—4.5 cm，宽3.2—4.8 cm；合萼片椭圆形，明显小于中萼片；花瓣狭矩圆形，长4.6—5.5 cm，宽1—1.4 cm，沿上下侧边缘具黑色疣状突起，先端约1/5向后卷；唇瓣盔状，内弯的侧裂片上具疣状突起；囊卵状椭圆形，长2.5—3 cm，宽2.2—2.6 cm，囊口两侧几乎不呈耳状；退化雄蕊倒卵形，长、宽各7—10 mm，基部具耳，先端有3齿，中央的齿明显较小。 $2n=36$ 。

花期：野外为3—6月。

分布：菲律宾中部。

说明：该种和菲律宾兜兰 (*P. philippinense*) 之间的天然杂种：展瓣兜兰 (杂种) (*Paphiopedilum* × *expansum* Atwood) (in Orchid Rev. 97: 183. 1989) 发现于菲律宾。此外，该种之下含有两个变型：白花变型f. *album* (未发表) 和克氏变型f. *christiansenii* (Gruss & Roeth) Gruss & Roeth (1999)。

Leaves 4–6, narrow-elliptic or narrow-oblong, 14–18 cm long, 3–4 cm wide, adaxially tessellated with dark and light green, abaxially pale green. Scape 22–32 cm long, pale purple, pubescent; bract ovate, 1.4–2.4 cm long, green, pubescent; pedicel and ovary 4–7 cm long, green, hairy; flower single, 7.5–8.5 cm across; sepals and petals white, with green or purple-green veins; lip pale purple-brown, tinged with green, with darker veins; staminode greenish-white or pale green-yellow, veined with green; dorsal sepal broadly ovate or suborbicular, 3–4.5 cm long, 3.2–4.8 cm wide; synsepal elliptic, much smaller than dorsal sepal; petals narrowly oblong, 4.6–5.5 cm long, 1–1.4 cm wide, black-warted along both upper and lower margins, revolute in apical one fifth; lip helmet-shaped, warted on its incurved side-lobes; pouch ovoid-ellipsoid, 2.5–3 cm long, 2.2–2.6 cm wide, scarcely auriculate on both sides of its mouth; staminode obovate, 7–10 mm long and wide,



图 10-21. 恒氏兜兰
Fig. 10-21. *Paphiopedilum hennisianum*
(M. W. Wood) Fowlie

auriculate basally, 3-toothed apically, the central tooth obviously smaller than the lateral ones. $2n=36$.

Flowering period: March to June in the wild.

Distribution: C Philippines.

Note: *Paphiopedilum* × *expansum* Atwood (in *Orchid Rev.* 97: 183. 1989), a natural hybrid of this species and *P. philippinense*, was described from the Philippines. Besides, this species contains two forms: f. *album* (unpublished) and f. *christiansenii* (Gruss & Roeth) Gruss & Roeth (1999).

22. 苏吉兜兰 (图10-22) (Fig. 10-22)

Paphiopedilum sugiyamanum Cavestro in Rhône-Alpes Orchid. 27: 3. 2001.

叶3—5枚, 椭圆状矩圆形, 长11—14 cm, 宽3.1—3.4 cm, 上面有灰绿色与深绿色相间的网格斑, 背面浅绿色, 先端钝并具3齿。花葶长30—35 cm, 具紫色短柔毛; 苞片绿色, 椭圆状矩圆形, 长2.4—2.6 cm; 花梗和子房暗褐色, 长5.8—6.2 cm, 被紫色短柔毛; 花单朵, 直径9—9.5 cm; 中萼片与合萼片浅绿色, 有绿色纵条纹; 花瓣浅绿色, 有栗色斑点, 稍有绿色条纹; 唇瓣绿色, 有浅褐色晕和褐色脉纹; 退化雄蕊有褐色与绿色网纹; 中萼片宽卵形, 长3.8—4.3 cm, 宽3.4—3.6 cm; 合萼片狭卵形, 长3.3—3.7 cm, 宽1.5—1.7 cm; 花瓣椭圆状矩圆形, 长4.5—4.8 cm, 宽1.5—1.7 cm, 近水平伸展, 上端约1/4强烈后弯, 边缘有紫色缘毛; 唇瓣盔状, 内弯的侧裂片上具疣状突起; 囊卵状椭圆形, 长3.8—4 cm, 宽2.6—2.8 cm, 囊口两侧几乎不呈耳状; 退化雄蕊圆形或近肾形, 长约9 mm, 宽10 mm, 基部深2裂, 先端具深湾缺, 两侧裂片内弯, 上面具白色微柔毛。

花期: 野外为3月。

分布: 马来西亚(沙巴)。

Leaves 3–5, elliptic-oblong, 11–14 cm long, 3.1–3.4 cm wide, adaxially tessellated with grayish-green and deep green, abaxially pale green, apex obtuse and tridenticulate. Scape 30–35 cm long, purple-pubescent; bract green, elliptic-oblong, 2.4–2.6 cm long; pedicel and ovary dark brown, 5.8–6.2 cm long, purple-pubescent; flower single, 9–9.5 cm across; dorsal sepal and synsepal pale green, with green longitudinal stripes; petals pale green, maroon-spotted, slightly green-striped; lip green tinged with pale brown and veined with brown; staminode reticulated with green and brown; dorsal sepal broadly ovate, 3.8–4.3 cm long, 3.4–3.6 cm wide; synsepal ovate, 3.3–3.7 cm long, 1.5–1.7 cm wide; petals elliptic-oblong, 4.5–4.8 cm long, 1.5–1.7 cm wide, spreading subhorizontally, strongly recurved in apical one fourth, purple-ciliate; lip helmet-shaped, warty on its incurved side-lobes; pouch ovoid-ellipsoid, 3.8–4 cm long, 2.6–2.8 cm wide, scarcely auriculate on both sides of its mouth; staminode orbicular or somewhat reniform, ca. 9 mm long, 10 mm wide, deeply bilobed basally, with a deep sinus and two incurved lateral lobes apically, white-puberulous adaxially.

Flowering period: March in the wild.

Distribution: Malaysia (Sabah).



图 10-22. 苏吉兜兰

Fig. 10-22. *Paphiopedilum sugiyamanum* Cavestro

23. 佛氏兜兰 (图10-23) (Fig. 10-23)

Paphiopedilum fowliei Birk in Orchid Digest 45: 63. 1981.

Paphiopedilum hennisianum (M. W. Wood) Fowlie var. *fowliei* (Birk) P. J. Cribb

叶4—6枚, 狭椭圆形, 长10—14 cm, 宽2—3.5 cm, 上面有绿色和浅灰绿色相间的网格斑, 背面浅绿色。花葶长20—28 cm, 浅紫色, 被短柔毛; 苞片卵形, 长1.4—2.4 cm, 绿色, 被短毛; 花梗与子房长3.6—6 cm, 绿色, 被短毛; 花单朵, 直径7—9 cm; 萼片与花瓣白色, 有绿色与紫色脉, 常有不同程度的紫色晕; 唇瓣浅紫红色或浅褐黄色, 有暗色脉纹; 退化雄蕊浅绿色或浅绿黄色, 具绿色脉纹; 中萼片宽卵形或宽椭圆形, 长4—6 cm, 宽3—4 cm; 合萼片卵状椭圆形, 小于中萼片; 花瓣下弯并略呈S形, 狭矩圆形, 长4—6 cm, 宽1—1.5 cm, 沿上下侧边缘具黑色疣状突起, 有缘毛; 唇瓣盔状, 内弯侧裂片上具疣状突起; 囊近卵形, 长3—3.5 cm, 宽2.3—3 cm, 囊口两侧稍呈耳状; 退化雄蕊近马蹄状, 长、宽各7—10 mm, 先端具3齿, 两个侧齿明显较长且内弯。2n=36。



图 10-23. 佛氏兜兰

Fig. 10-23. *Paphiopedilum fowliei* Birk

花期: 野外为3—6月。

分布: 菲律宾(巴拉望)。

说明: 该种含有一些变型, 如白花变型 *f. album* (未发表)、克列变型 *f. christiana* Braem (1998) 和桑吉变型 *f. sangianum* (Braem) Gruss (1999) (basionym: *P. fowliei* var. *sangianum* Braem)。

Leaves 4–6, narrowly elliptic, 10–14 cm long, 2–3.5 cm wide, adaxially tessellated with green and pale gray-green, abaxially pale green. Scape 20–28 cm long, pale purple, pubescent; bract ovate, 1.4–2.4 cm long, green, shortly

hairy; pedicel and ovary 3.6–6 cm long, green, shortly hairy; flower single, 7–9 cm across; sepals and petals white, with green and purple veins, often flushed to varying degrees with purple; lip pale purple-red or pale brown-yellow, with darker veins; staminode pale green or pale green-yellow, veined with green; dorsal sepal broad-ovate or broad-elliptic, 4–6 cm long, 3–4 cm wide; synsepal ovate-elliptic, smaller than dorsal sepal; petals deflexed and somewhat sigmoid, narrowly oblong, 4–6 cm long, 1–1.5 cm wide, black-warted on both upper and lower margins, ciliate; lip helmet-shaped, warted on its incurved side-lobes; pouch subovoid, 3–3.5 cm long, 2.3–3 cm wide, slightly auriculate on both sides of its mouth; staminode somewhat horseshoe-shaped, 7–10 mm long and wide, 3-toothed apically,

with side-teeth much longer and falcate-incurved. $2n=36$.

Flowering period: March to June in the wild.

Distribution: Philippines (Palawan).

Note: This species contains a few forms, such as *f. album* (unpublished), *f. christinae* Braem (1998) and *f. sangianum* (Braem) Gruss (1999) (basionym: *P. fowliei* var. *sangianum* Braem).

24. 劳氏兜兰 (图10-24) (Fig. 10-24)

Paphiopedilum lawrenceanum (Rchb. f.) Pfitzer in Jahrb. Wiss. Bot. 19: 163. 1888.

Cypripedium lawrenceanum Rchb. f. in Gard. Chron. n. s., 10: 748. 1878.

Cordula lawrenceana (Rchb. f.) Rolfe

Paphiopedilum barbatum (Lindl.) Pfitzer subsp. *lawrenceanum* (Rchb. f.) M. W. Wood

叶5—6枚, 狭椭圆形, 长19—27 cm, 宽4—6.5 cm, 上面有深绿色和黄绿色相间的网格斑, 背面浅绿色。花葶长31—40 cm, 栗色, 被短柔毛; 苞片卵形, 长1.6—2 cm, 绿色, 有栗色脉; 花梗和子房长4—7 cm, 绿色, 有栗色纵肋; 花单朵, 直径11—12 cm; 中萼片与合萼片白色, 有栗色脉, 具绿色晕; 花瓣绿色或绿黄色, 近先端紫色, 沿上下侧边缘具黑栗色疣状突起; 唇瓣浅紫褐色, 有深色脉, 下部有黄绿色晕; 退化雄蕊浅绿色, 有深绿色脉和紫色边缘; 中萼片宽卵圆形, 长、宽约6 cm; 合萼片卵形, 明显小于中萼片; 花瓣狭矩圆形, 近平展, 长约6 cm, 宽1.1—1.5 cm, 边缘有紫色缘毛; 唇瓣盔状, 内弯侧裂片上具栗色疣状突起; 囊卵状椭圆形, 长3.5—4 cm, 宽2.8—3.2 cm, 囊口两侧几乎不呈耳状; 退化雄蕊略呈新月形, 长9—11 mm, 宽13—14 mm, 先端有弯缺, 中央具1齿。2n=36。

花期: 野外为3—5月。

分布: 马来西亚 (沙捞越)。

说明: 产于婆罗洲的列图兜兰 (杂种) (*P. × littleanum* Rolfe) (in orchid

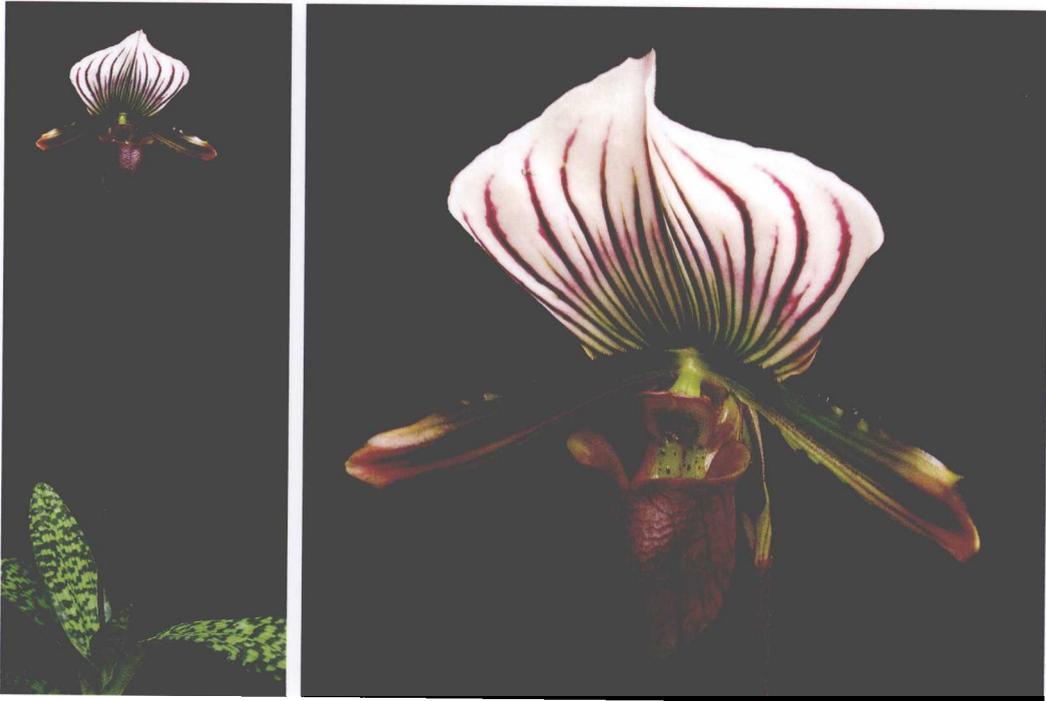


图 10-24. 劳氏兜兰

Fig. 10-24. *Paphiopedilum lawrenceanum* (Rchb. f.) Pfitzer

Rev. 4: 366.1896) 被认为是本种与沙巴兜兰 (*P. dayanum*) 之间的杂种。基于花的色泽变化, 已建立了许多变种。其中有的变种如 var. *hye anum* (Linden & Rodigas) Braem (Basionym: *Cypripedium hyeanum* Linden & Rodigas), 已被降为白花变型 f. *hye anum* (Linden & Rodigas) Gruss & Roeth (1999)。其他变种, 正如 P. J. Cribb (1998) 所指出的, 最好也应降为变型等级。

Leaves 5–6, narrowly elliptic, 19–27 cm long, 4–6.5 cm wide, adaxially tessellated with dark green and yellow-green, abaxially pale green. Scape 31–40 cm long, maroon, pubescent; bract ovate, 1.6–2 cm long, green, veined with maroon; pedicel and ovary 4–7 cm long, green, longitudinally maroon-ridged; flower single, 11–12 cm across; dorsal sepal and synsepal white, maroon-veined, flushed with green; petals green or green-yellow, purple toward the apex, with black-maroon warts on the upper and lower margins; lip pale purple-brown, with darker veins, flushed with yellow-green in lower part; staminode pale green, with deep green veins and purple margins; dorsal sepal broadly ovate-orbicular, ca. 6 cm long and wide; synsepal ovate, conspicuously smaller than dorsal sepal; petals narrowly oblong, almost spreading horizontally, ca. 6 cm long, 1.1–1.5 cm wide, purple-ciliate; lip helmet-shaped, maroon-warted on its incurved side-lobes; pouch ovoid-ellipsoid, 3.5–4 cm long, 2.8–3.2 cm wide, scarcely auriculate on both sides of its mouth; staminode somewhat lunate, 9–11 mm long, 13–14 mm wide, with a sinus and a central tooth apically. $2n=36$.

Flowering period: March to May in the wild.

Distribution: Malaysia (Sarawak).

Note: *Paphiopedilum* × *little anum* Rolfe (in Orchid Rev. 4: 366.1896) described from Borneo was considered to be a hybrid of this species and *P. dayanum*. Many varieties of this species have been established based on their floral coloration, some of which have been reduced to forms. For example, var. *hye anum* (Linden & Rodigas) Braem (basionym: *Cypripedium hyeanum* Linden & Rodigas) was reduced to a form, f. *hye anum* (Linden & Rodigas) Gruss & Roeth, in 1999. Others are best treated as forms too, as pointed out by P. J. Cribb (1998).

25. 沙巴兜兰 (图10-25) (Fig. 10-25)

Paphiopedilum dayanum (Lindl.) Stein, Orchideenbuch: 464. 1892.

Cypripedium spectabile Rchb. f. var. *dayanum* Lindl. in Gard. Chron.: 693. 1860.

Cypripedium superbiens Rchb. f. var. *dayanum* (Lindl.) Rchb. f.

Cypripedium dayanum (Stone ex Lindl.) Lindl.

Cypripedium dayanum (Lindl.) Rchb. f.

Cypripedium petri Rchb. f.

Cypripedium burbidgei Rchb. f.

Cypripedium peteri de Vos

Cypripedium ernestianum L. Castle

Paphiopedilum petri (Rchb. f.) Pfitzer

Paphiopedilum burbidgei (Rchb. f.) Pfitzer

Paphiopedilum dayanum var. *petri* (Rchb. f.) Pfitzer

Cordula petri (Rchb. f.) Rolfe

Cordula dayana (Lindl.) Rolfe

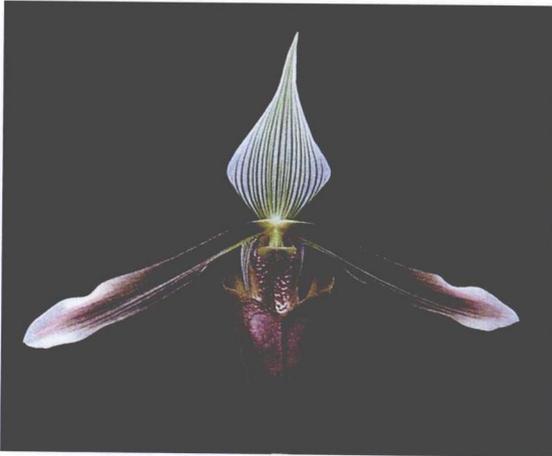


图 10-25. 沙巴兜兰

Fig. 10-25. *Paphiopedilum dayanum* (Lindl.) Stein

叶4—6枚，矩圆状披针形，长18—21 cm，宽4—5 cm，上面有深绿色与浅绿色或浅绿黄色相间的网格斑，背面浅绿色。花葶长20—34 cm，栗色，密被短柔毛；苞片卵状披针形，长约2.5 cm，浅绿色，被短毛；花梗与子房长达7 cm，绿色至浅栗色，被短毛；花单朵，直径13—15 cm；中萼片与合萼片白色，具绿色脉；花瓣浅紫红色，有暗色脉，有时上部为绿白色；唇瓣栗色或紫褐色；退化雄蕊浅绿色，具深色脉纹；中萼片卵形，长5—6 cm，宽3—3.8 cm；合萼片狭卵形，长4—5 cm，宽1.5—2 cm；花瓣狭矩圆状匙形或倒披针状匙形，长7—8.5 cm，

宽1.5—1.8 cm，边缘具紫色缘毛；唇瓣盔状，内弯侧裂片上具疣状突起；囊近卵形，长3.5—4 cm，宽2—3 cm，囊口两侧略呈耳状；退化雄蕊近横椭圆形或肾形，长6—8 mm，宽达13 mm，先端为骤尖式短尖，上面被微柔毛。 $2n=34, 36$ 。

花期：野外为3—5月。

分布：文莱、印度尼西亚（加里曼丹）、马来西亚（沙巴）。

说明：发现于婆罗洲的柏比兜兰 [*Paphiopedilum burbidgei* (Rchb. f.) Pfitzer] (in Bot.

Jahrb. Syst. 19: 40. 1894) (基名: *Cypripedium burbidgei* Rchb. f.) (in Gard. Chron. n. s., 16: 38. 1881) 曾被某些作者认为是该种与爪哇兜兰绿花变种 (*P. javanicum* var. *virens*) 之间的天然杂种, 但我们认为就是此种的异名。

Leaves 4–6, oblong-lanceolate, 18–21 cm long, 4–5 cm wide, adaxially tessellated with deep green and greenish or pale green-yellow, abaxially pale green. Scape 20–34 cm long, maroon, densely pubescent; bract ovate-lanceolate, ca. 2.5 cm long, greenish, shortly hairy; pedicel and ovary to 7 cm long, green to deep maroon, shortly hairy; flower single, 13–15 cm across; dorsal sepal and synsepal white, veined with green; petals pale purple-red, with darker veins, sometimes greenish-white in upper part; lip deep maroon or purple-brown; staminode greenish, with deeper veins; dorsal sepal ovate, 5–6 cm long, 3–3.8 cm wide; synsepal narrowly ovate, 4–5 cm long, 1.5–2 cm wide; petals narrowly oblong-spatulate or oblanceolate-spatulate, 7–8.5 cm long, 1.5–1.8 cm wide, purple-ciliate; lip helmet-shaped, warted on its incurved side-lobes; pouch subovoid, 3.5–4 cm long, 2–3 cm wide, slightly auriculate on both sides of its mouth; staminode nearly transverse-elliptic or reniform, 6–8 mm long, to 13 mm wide, cuspidate-mucronate apically, puberulous adaxially. $2n=34, 36$.

Flowering period: March to May in the wild.

Distribution: Brunei Darussalam, Indonesia (Kalimautan), Malaysia (Sabah).

Note: *Paphiopedilum burbidgei* (Rchb. f.) Pfitzer (in Bot. Jahrb. Syst. 19: 40. 1894) (basonym: *Cypripedium burbidgei* Rchb. f.) (in Gard. Chron. n. s., 16: 38. 1881), a native of Borneo, was once considered by some authors to be a natural hybrid of this species and *P. javanicum* var. *virens*, but we treat it as a synonym of this species.

26. 缘毛兜兰 (图10-26) (Fig. 10-26)

Paphiopedilum ciliolare (Rchb. f.) Stein, Orchideenbuch: 462. 1892.*Cypripedium ciliolare* Rchb. f. in Gard. Chron. n. s., 18: 488. 1882.*Cypripedium miteauanum* Linden & Rodigas*Cypripedium cilolare* Rchb. f. var. *miteauanum* Linden*Paphiopedilum ciliolare* var. *miteauanum* (Linden) Pfitzer*Cordula ciliolaris* (Rchb. f.) Rolfe*Paphiopedilum superbiens* (Rchb. f.) Stein subsp. *ciliolare* (Rchb. f.) M. W. Wood

叶4—6枚, 矩圆状椭圆形或狭矩圆形, 长10—20 cm, 宽2.6—5 cm, 上面有深浅绿色相间的网格斑, 背面浅绿色并在基部具紫晕。花葶长28—40 cm, 紫色, 被短毛; 苞片卵状披针形, 长1.7—3 cm, 被短柔毛; 花梗和子房长5—8 cm, 紫褐色, 被短柔毛; 花单朵, 直径7—10 cm; 中萼片与合萼片浅紫褐色至浅紫红色, 有暗色脉, 上部与边缘通常白色, 有时有绿色晕; 花瓣白色至浅紫红色, 有深紫色脉和浓密的黑色斑点; 唇瓣浅紫褐色或浅栗色; 退化雄蕊浅黄绿色而有深绿色脉纹, 有时有褐色晕; 中萼片宽卵形, 长3.8—5.8 cm, 宽3.5—5.1 cm; 合萼片卵形, 小于中萼片; 花瓣狭矩圆形, 长5—7.2 cm, 宽1.5—2.8 cm, 沿上侧边缘具黑色疣状突起, 有缘毛; 唇瓣盔状, 内弯的侧裂片上具疣状突起; 囊卵形, 长3.5—4 cm, 宽3—3.5 cm, 囊口两侧稍呈耳状; 退化雄蕊略近肾形, 长10—11 mm, 宽12—14 mm, 先端稍具3齿, 基部有深的缺口。 $2n=32$ 。



图 10-26. 缘毛兜兰

Fig. 10-26. *Paphiopedilum ciliolare* (Rchb. f.) Stein

花期：野外为4—6月。

分布：菲律宾（吕宋至棉兰老）。

Leaves 4–6, oblong-elliptic or narrowly oblong, 10–20 cm long, 2.6–5 cm wide, adaxially tessellated with dark and light green, abaxially pale green and flushed with purple toward the base. Scape 28–40 cm long, purple, shortly hairy; bract ovate-lanceolate, 1.7–3 cm long, shortly hairy; pedicel and ovary 5–8 cm long, purple-brown, shortly hairy; flower single, 7–10 cm across; dorsal sepal and synsepal pale purple-brown to pale purple-red, with darker veins, white in upper part and on margins, sometimes tinged with green; petals white to pale purple-red, veined with deep purple and heavily spotted with black; lip pale purple-brown or pale maroon; staminode pale yellow-green, veined with deep green, sometimes flushed with brown; dorsal sepal broadly ovate, 3.8–5.8 cm long, 3.5–5.1 cm wide; synsepal ovate, smaller than dorsal sepal; petals narrowly oblong, 5–7.2 cm long, 1.5–2.8 cm wide, black-warted on the margin of the upper side, ciliate; lip helmet-shaped, warted on its incurved side-lobes; pouch ovoid, 3.5–4 cm long, 3–3.5 cm wide, slightly auriculate on both sides of its mouth; staminode somewhat reniform, 10–11 mm long, 12–14 mm wide, slightly 3-toothed apically, deep-incised basally. $2n=32$.

Flowering period: April to June in the wild.

Distribution: Philippines (Luzon to Mindanao).

27. 华丽兜兰 (图10-27) (Fig. 10-27)

Paphiopedilum superbiens (Rchb. f.) Stein, Orchideenbuch: 487. 1892.

Cypripedium superbiens Rchb. f. in Bonplandia 3: 227. 1855.

Cypripedium barbatum Lindl. var. *veitchii* Van Houtte

Cypripedium veitchianum Lemaire

Cypripedium barbatum Lindl. var. *superbum* E. Morren

Cordula superbiens (Rchb. f.) Rolfe

叶4—6枚, 椭圆形或矩圆状椭圆形, 长15—24 cm, 宽4—6.5 (—8) cm, 上面有深浅绿色相间的网格斑, 背面浅绿色, 基部有紫色晕。花葶长可达30 cm, 紫褐色, 被短柔毛; 苞片卵状披针形, 长2—3 cm, 浅紫褐色, 被短毛; 花梗和子房长6—8 cm, 紫褐色, 被短毛; 花单朵, 直径7—8 cm; 中萼片与合萼片白色, 具紫色与绿色脉, 有时有浅绿色或浅紫色晕; 花瓣乳白玫瑰色, 具紫色脉, 具密集的紫色或黑色斑点; 唇瓣深栗色至紫褐色; 退化雄蕊浅黄绿色, 有深绿色脉纹; 中萼片宽卵形, 长3.4—6 cm, 宽3—5.3 cm, 边缘具缘毛; 合萼片卵形, 明显窄于中萼片; 花瓣下弯或近下垂, 狭矩形, 稍镰曲, 长5.2—7.5 cm, 宽1.5—2 cm, 上侧边缘和下半部具凸起的斑点, 上半部半扭转, 边缘有缘毛; 唇瓣盔状, 内弯侧裂片上具疣状突起; 囊近卵形, 长3.5—4.5 cm, 宽2.6—3 cm, 囊口两侧几乎不呈耳状; 退化雄蕊近半圆形



图 10-27. 华丽兜兰

Fig. 10-27. *Paphiopedilum superbiens* (Rchb. f.) Stein

或肾形，长9—12 mm，宽14—20 mm，先端有宽阔的弯缺，上面被微柔毛。 $2n=36$ 。

花期：园中栽培为3—6月。

分布：印度尼西亚（苏门答腊）。

说明：该种的2个变种已被一些植物学家所承认，即三德兜兰（变种）var. *sanderiae* (Curtis) Braem (1988) 与克氏兜兰（变种）var. *curtii* (Rchb. f.) Braem (1988)。它们与原变种的区别主要在于花的大小与色泽差异。前一个变种早在1975年就有人将它降为变型：*P. superbiens* f. *sanderiae* (Curtis) M. W. Wood，后者似乎也可以降为变型。

Leaves 4–6, elliptic or oblong-elliptic, 15–24 cm long, 4–6.5(–8) cm wide, adaxially tessellated with dark and light green, abaxially pale green and flushed with purple toward the base. Scape to 30 cm long, purple-brown, pubescent; bract ovate-lanceolate, 2–3 cm long, pale purple-brown, shortly hairy; pedicel and ovary 6–8 cm long, purple-brown, shortly hairy; flower single, 7–8 cm across; dorsal sepal and synsepal white, veined with purple and green, sometimes flushed with pale green or pale purple; petals whitish-rose, veined with purple, densely spotted with purple or black; lip deep maroon to purple-brown; staminode pale yellow-green, veined with deep green; dorsal sepal broadly ovate, 3.4–6 cm long, 3–5.3 cm wide, ciliate; synsepal ovate, conspicuously narrower than dorsal sepal; petals deflexed or nearly pendulous, narrowly oblong, slightly falcate, 5.2–7.5 cm long, 1.5–2 cm wide, with raised spots on the margin of the upper side and the surface in basal half, half-twisted in apical half, ciliate; lip helmet-shaped, warted on its incurved side-lobes; pouch subovoid, 3.5–4.5 cm long, 2.6–3 cm wide, scarcely auriculate on both sides of its mouth; staminode nearly semiorbicular or reniform, 9–12 mm long, 14–20 mm wide, with a broad sinus apically, puberulous adaxially. $2n=36$.

Flowering period: March to June in cultivation.

Distribution: Indonesia (Sumatra).

Note: Two varieties of this species were recognized by some botanists: var. *sanderiae* (Curtis) Braem (1988) and var. *curtii* (Rchb. f.) Braem (1988). They differ from the typical variety mainly by floral size and coloring. The former was treated as a form, *P. superbiens* f. *sanderiae* (Curtis) M. W. Wood, as early as in 1975, and the latter seems to be best treated as a form too.

28. 尖齿兜兰 (图10-28) (Fig. 10-28)

Paphiopedilum acmodontum Schoser ex M. W. Wood in Orchid Rev. 84: 350. 1976.

叶4—5枚, 矩圆状椭圆形, 长12—18 cm, 宽约4 cm, 上面有深浅绿色相间的网格斑, 背面浅绿色。花葶长20—34 cm, 绿色, 有紫色斑, 被疏毛; 苞片卵形, 长约3 cm,



被疏毛; 花梗和子房长4.5—6 cm, 绿色, 具浅紫褐色纵肋, 被短毛; 花单朵, 直径7—8 cm; 中萼片与合萼片白色, 常有紫红色晕, 具暗紫色或紫绿色脉; 花瓣下半部绿色并有黑色斑点, 上半部紫色, 上下部均有暗色脉; 唇瓣橄榄绿或浅褐色, 有模糊的脉纹, 内弯侧裂片上有红色斑点; 退化雄蕊浅绿色, 有深绿色或浅褐色斑; 中萼片卵形, 长3.5—4 cm, 宽约3 cm; 合萼片卵状椭圆形, 小于中萼片; 花瓣矩圆状倒披针形, 长4.3—5.1 cm, 宽1.4—2 cm, 边缘有缘毛; 唇瓣盔状; 囊椭圆状卵形, 长2.5—3 cm, 宽2.3—2.6 cm, 前端边缘具1个短尖头, 囊口两侧呈耳状; 退化雄蕊近方形或宽倒卵形, 长、宽各约1 cm, 上面被微柔毛, 先端具3齿, 两侧的齿较小或不明显。

花期: 野外为2—4月。

分布: 菲律宾中部。

Leaves 4–5, oblong-elliptic, 12–18 cm long, ca. 4 cm wide, adaxially tessellated with dark and light green, abaxially pale green. Scape 20–34 cm long, green, marked with purple, sparsely hairy; bract ovate, ca. 3 cm long, sparsely hairy; pedicel and ovary 4.5–6 cm long, green, longitudinally purple-ridged, shortly hairy; flower single, 7–8 cm across; dorsal sepal and synsepal white, often flushed with purple-red, veined with dull purple or purple-green; petals green and spotted with black in basal half, purple in apical half, with darker veins throughout; lip olive-green or pale brown, with obscure veins, red-spotted on incurved side-lobes; staminode pale green, marked with deep green or pale brown; dorsal sepal ovate, 3.5–4 cm long, ca. 3 cm wide; synsepal ovate-elliptic, smaller than dorsal sepal; petals oblong-oblancoate, 4.3–5.1 cm long, 1.4–2 cm wide, ciliate; lip helmet-

图 10-28. 尖齿兜兰

Fig. 10-28. *Paphiopedilum acmodontum*
Schoser ex M. W. Wood

shaped; pouch 2.5–3 cm long, 2.3–2.6 cm wide, with a short point (apiculum) at the front margin, auriculate on both sides of its mouth; staminode subsquare or broadly obovate, ca. 1 cm long and wide, adaxially puberulous, 3-toothed apically, the lateral two teeth smaller or inconspicuous.

Flowering period: February to April in the wild.

Distribution: C Philippines.

29. 爪哇兜兰 (图10-29) (Fig. 10-29)

Paphiopedilum javanicum (Reinw. ex Lindl.) Pfitzer in Jahrb. Wiss. Bot. 19: 165. 1888.

Cypripedium javanicum Reinw. ex Lindl. in Paxton's Fl. Gard. 1: 38. 1850.

Cordula javanica (Reinw. ex Lindl.) Rolfe

叶4—5枚, 狭椭圆形, 长10—23 cm, 宽3.4—5 cm, 上面有深浅绿色相间的网格斑, 背面浅绿色。花葶长16—36 cm, 紫色, 被短毛; 苞片椭圆状披针形, 长1.5—2.5 cm, 浅绿色; 花梗与子房长4.5—5 cm, 浅绿色, 有暗色纵肋; 花单朵或极罕2朵, 直径8—9 cm; 中萼片与合萼片浅绿色, 有暗绿色脉, 有时边缘有浅粉红色晕; 花瓣下部3/4浅绿色并有暗栗色小斑点, 上部1/4粉红紫色; 唇瓣浅绿褐色, 有暗色脉; 退化雄蕊浅黄绿色, 有紫色或绿色脉纹; 中萼片宽卵形, 长3—4.3 cm, 宽2.5—2.9 cm, 背面被短柔毛; 合萼片卵状披针形, 明显小于中萼片; 花瓣狭矩圆形, 长4—5 cm, 宽1.3—1.5 cm, 边缘有短缘毛; 唇瓣盔状, 内弯侧裂片上有疣点; 囊近卵形, 长2.2—2.7 cm, 宽1.8—2 cm, 外表面有微柔毛, 囊口两侧略呈耳状; 退化雄蕊近肾状心形, 长约8 mm, 宽10 mm, 先端有弯缺, 上面被微柔毛。2n=36, 38。

花期: 园中栽培为11—12月或4—8月。

分布: 印度尼西亚、马来西亚。

说明: 该种的变种绿花兜兰(变种) *P. javanicum* var. *virens* (Rchb. f.) Stein (1892) (basionym: *Cypripedium virens* Rchb. f.; Syn.: *Paphiopedilum purpurascens* Fowlie) 产于婆罗洲。它与原变种的区别在于具绿色的花, 其花瓣更接近匙形, 较少栗色斑点, 而且近水平伸展, 子房的毛也较多。此外, 还报告有一个素心变型: f. *nymphenburgianum* (Roeth & Gruss) P. J. Cribb (1998)。

Leaves 4–5, narrowly elliptic, 10–23 cm long, 3.4–5 cm wide, abaxially tessellated



with dark and light green, abaxially pale green. Scape 16–36 cm long, purple, shortly hairy; bract elliptic-lanceolate, 1.5–2.5 cm long, pale green; pedicel and ovary 4.5–5 cm long, pale green, longitudinally darker-ridged; flowers single or very rarely two, 8–9 cm across; dorsal sepal and synsepal pale green, veined with dark green, margins sometimes flushed with pale pink; petals pale green and finely spotted

图 10-29. 爪哇兜兰

Fig. 10-29. *Paphiopedilum javanicum* (Reinw. ex Lindl.) Pfitzer

with dark maroon in basal three quarters, pink-purple in apical one quarter; lip pale green-brown, with darker veins; staminode pale yellow-green, veined with purple or green; dorsal sepal broadly ovate, 3–4.3 cm long, 2.5–2.9 cm wide, pubescent abaxially; synsepal ovate-lanceolate, conspicuously smaller than dorsal sepal; petals narrowly oblong, 4–5 cm long, 1.3–1.5 cm wide, shortly ciliate; lip helmet-shaped, verrucose on its incurved side-lobes; pouch subovoid, 2.2–2.7 cm long, 1.8–2 cm wide, puberulous outside, slightly auriculate on both sides of its mouth; staminode somewhat reniform-cordate, ca. 8 mm long, 10 mm wide, with a sinus apically, puberulous adaxially. $2n=36, 38$.

Flowering period: November and December or April to August in cultivation.

Distribution: Indonesia, Malaysia.

Note: Its variety, *P. javanicum* var. *virens* (Rchb. f.) Stein (1892) (basionym: *Cypripedium virens* Rchb. f.; syn.: *Paphiopedilum purpurascens* Fowlie), is a native of Borneo, differing from the typical variety (*P. javanicum* var. *javanicum*) by its green flower with less maroon spots on the subspatulate petals which spread almost horizontally, and more pubescent ovary. Besides, there is an albino form known to us: f. *nymphenburgianum* (Roeth & Gruss) P. J. Cribb (1998).

30. 帕氏兜兰 (图10-30) (Fig. 10-30)

Paphiopedilum parnatanum Cavestro in Orch. Cult. Protect. 38 (2): 30.1999.

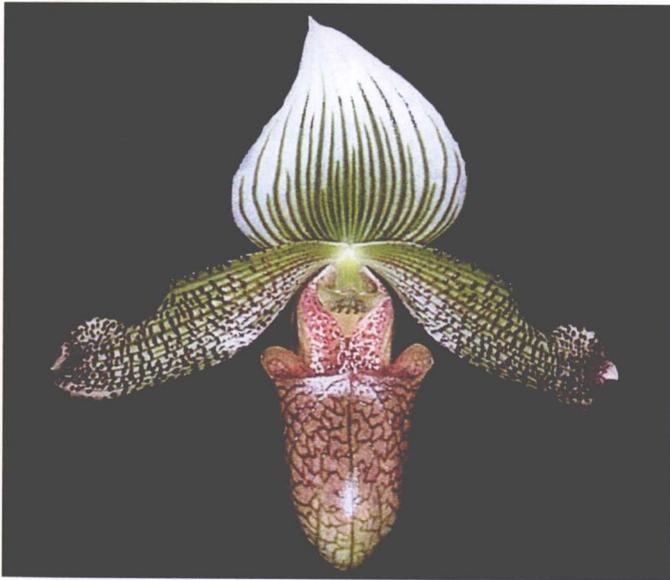
Paphiopedilum usitanum Gruss & Roeth

叶3—4枚, 矩圆状披针形, 长8—20 cm, 宽1.8—3.5 cm, 上面具深浅绿色相间的网格斑, 背面浅绿色。花葶长18—20 cm; 花单生, 直径7.5—8 cm; 中萼片与合萼片白色, 基部浅绿色, 有暗绿色纵条纹; 花瓣浅绿色或绿白色, 有绿色纵脉, 有密集横矩圆形栗色细斑点; 唇瓣浅褐色, 有暗褐色网纹; 退化雄蕊浅绿色; 中萼片宽卵形, 长3—3.2 cm, 宽2.9—3 cm; 合萼片小于中萼片; 花瓣稍下弯, 狭矩圆形, 长4.5—4.6 cm, 宽1.3—1.4 cm, 近基部有缘毛; 唇瓣盔状, 内弯侧裂片上具疣状突起; 囊近卵形, 长约3 cm, 宽2.3 cm, 囊口两侧几乎不呈耳状; 退化雄蕊近马蹄形, 长7—9 mm, 宽9—10 mm。

花期: 园中栽培为12月。

分布: 菲律宾。

Leaves 3—4, oblong-lanceolate, 8—20 cm long, 1.8—3.5 cm wide, adaxially tessellated with



dark and light green, abaxially pale green. Scape 18—20 cm long; flower single, 7.5—8 cm across; dorsal sepal and synsepal white, tinged with pale green toward the base, longitudinally dark green-striped; petals pale green or green-whitish, longitudinally green-veined, densely spotted with small transverse-oblong maroon; lip pale brown, reticulated with dark brown; staminode pale green; dorsal sepal broadly ovate, 3—3.2 cm long, 2.9—3 cm wide; synsepal

图 10-30. 帕氏兜兰

Fig. 10-30. *Paphiopedilum parnatanum* Cavestro

smaller than dorsal sepal; petals slightly recurved, narrowly oblong, 4.5—4.6 cm long, 1.3—1.4 cm wide, ciliate toward the base; lip helmet-shaped, warted on its incurved side-lobes; pouch subovoid, ca. 3 cm long, 2.3 cm wide, scarcely auriculate on both sides of its mouth; staminode somewhat horseshoe-shaped, 7—9 mm long, 9—10 mm wide.

Flowering period: December in cultivation.

Distribution: Philippines.

31. 休氏兜兰 (图10-31) (Fig. 10-31)

Paphiopedilum schoseri Braem & H. Mohr in *Schlechteriana* 1(2): 19. 1988.

Paphiopedilum bacanum Schoser

叶2—5枚, 矩圆状披针形或狭矩圆形, 长10—23 cm, 宽1.9—4.5 cm, 上面有模糊的深浅绿色相间的网格斑。背面浅绿色。花葶长15—20 cm, 被毛; 苞片卵状椭圆形, 长1.5—2.2 cm, 背面中脉被毛; 花梗和子房长3—3.5 cm, 被密毛; 花单朵或罕有2朵, 直径5—7 cm; 中萼片与合萼片白色, 具绿色或紫绿色脉; 花瓣绿白色, 有绿色脉和浮凸的黑色或黑褐色斑点, 基部有绿色晕, 上部有浅紫色晕, 沿上侧边缘具少数黑褐色疣状突起; 唇瓣浅绿色, 有深绿色脉; 退化雄蕊浅绿色或浅黄绿色, 有绿色脉纹; 中萼片宽卵形, 长2.9—4 cm, 宽2—3.5 cm, 背面被短毛, 边缘有缘毛; 合萼片凹陷, 矩圆状椭圆形, 明显狭于中萼片; 花瓣狭矩圆形或矩圆状倒披针形, 长3.5—5.5 cm, 宽0.8—1.4 cm, 边缘具缘毛; 唇瓣盔状, 内弯侧裂片上具褐色疣状突起; 囊近卵状椭圆形, 长2.5—3 cm, 宽2—2.5 cm, 外表面密被微柔毛; 退化雄蕊近马蹄形, 长9—11 mm, 宽约7 mm, 上面被微柔毛。2n=35。

花期: 野外为12月。

分布: 印度尼西亚(马鲁古群岛)。

Leaves 2–5, oblong-lanceolate or narrowly oblong, 10–23 cm long, 1.9–4.5 cm wide, adaxially obscurely tessellated with dark and light green, abaxially pale green. Scape 15–20 cm long, hairy; bracts ovate-elliptic, 1.5–2.2 cm long, hairy along abaxial midvein; pedicel and ovary 3–3.5 cm long, densely hairy; flowers single or rarely two, 5–7 cm across; dorsal sepal and synsepal white, veined with green or purple-green; petals green-white, with green veins and black or black-brown raised spots, flushed with green toward the base and pale purple in upper part, with a few black-brown warts on the margin of the upper side; lip pale green, veined with deep green; staminode pale green or pale yellow-green, with green veins; dorsal sepal broadly ovate, 2.9–4 cm long, 2–3.5 cm wide, abaxially shortly hairy, ciliate; synsepal concave, oblong-elliptic, conspicuously narrower than dorsal sepal; petals narrowly oblong or oblong-ob lanceolate, 3.5–5.5 cm long, 0.8–1.4 cm wide, ciliate; lip helmet-shaped, brown-warted on its incurved side-lobes; pouch subvoid-ellipsoid, 2.5–3 cm long, 2–2.5 cm wide, densely puberulous on outer surface; staminode somewhat horseshoe-shaped, 9–11 mm long, ca. 7 mm wide, puberulous adaxially. 2n=35.

Flowering period: December in the wild.

Distribution: Indonesia (Maluku Islands).

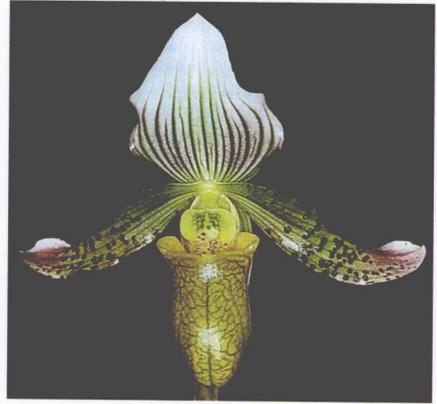


图 10-31. 休氏兜兰

Fig. 10-31. *Paphiopedilum schoseri* Braem & H. Mohr

32. 民岛兜兰 (图10-32) (Fig. 10-32)

Paphiopedilum urbanianum Fowlie in Orchid Digest 45: 131. 1981.

叶4—6枚, 狭椭圆形, 长12—20 cm, 宽3—4 cm, 上面有深浅绿色相间的网格斑, 背面浅绿色。花葶长20—30 cm, 紫褐色, 密被短柔毛; 苞片卵形, 长2—3 cm, 绿色, 被短毛; 花梗与子房长5—7.5 cm, 绿色, 有栗色纵肋; 花1—2朵, 直径8.5—10 (—12) cm; 中萼片与合萼片白色, 有绿色或暗绿色脉; 花瓣下半部浅绿色或绿白色, 有绿色脉, 上半部紫色, 中部具栗色疣状斑点; 唇瓣浅紫褐色, 有深色脉; 退化雄蕊浅黄绿色, 有绿色纵脉; 中萼片宽卵形, 长2.6—3.6 cm, 宽3.2—4.2 cm; 合萼片卵形, 小于中萼片; 花瓣矩圆状倒披针形, 长5.5—6 cm, 宽1.2—1.8 cm, 边缘具缘毛; 唇瓣盔状, 内弯侧裂片上具疣状突起; 囊椭圆状卵形, 长2.8—3.5 cm, 宽2.2—3 cm; 退化雄蕊略近圆形, 长10—13 mm, 宽约10 mm, 上面被微柔毛, 先端有弯缺, 弯缺中央具1个小齿。2*n*=40。



图 10-32. 民岛兜兰
Fig. 10-32. *Paphiopedilum urbanianum*
Fowlie

花期: 野外为12月至翌年4月。

分布: 菲律宾(民都洛)。

说明: 该种之下发现一个白化型, 即白绿变型 *f. alboviride* Braem (1998), 产于菲律宾。

Leaves 4—6, narrowly elliptic, 12—20 cm long, 3—4 cm wide, adaxially tessellated with dark and light green, abaxially pale green. Scape 20—30 cm long, purple-brown, densely pubescent; bracts ovate, 2—3 cm long, green, shortly hairy; pedicel and ovary 5—7.5 cm long, green, longitudinally maroon-ridged; flowers 1—2, 8.5—10 (—12) cm across; dorsal sepal and synsepal white, veined with green or dark green; petals pale green or green-white and veined with green in basal half, purple in apical half, with maroon wart-like spots in the middle part; lip pale purple-brown, with darker veins; staminode pale yellow-green, longitudinally lined with green; dorsal sepal broadly ovate, 2.6—3.6 cm long, 3.2—4.2 cm wide; synsepal ovate, smaller than dorsal sepal; petals oblong-ob lanceolate, 5.5—6 cm long, 1.2—1.8 cm wide, ciliate; lip helmet-shaped, warty on its incurved side-lobes; pouch ellipsoid-ovoid, 2.8—3.5 cm long, 2.2—3 cm wide; staminode somewhat orbicular, puberulous adaxially, 10—13 mm long, ca. 10 mm wide, with a sinus and a central tooth apically. 2*n*=40.

Flowering period: December to April in the wild.

Distribution: Philippines (Mindoro).

Note: An albino form of this species, *f. alboviride* Braem (1998), was described from the Philippines.

33. 苏氏兜兰 (图10-33) (Fig. 10-33)

Paphiopedilum sukhakulii Schoser & Senghas in Die Orchidee 16: 110. 1965.*Paphiopedilum dixlerianum* Braem & Chiron

叶3—5(—8)枚, 狭矩圆状椭圆形, 长10—25 cm, 宽3—5 cm, 上面具深绿色与浅黄绿色相间的网格斑, 背面浅绿色。花葶长15—25 cm, 紫褐色, 被白色短毛; 苞片卵状披针形, 长1.5—2.5 cm, 绿色, 被短毛; 花梗和子房长3.5—6 cm, 绿色, 被短毛; 花单朵, 直径11—15 cm; 中萼片与合萼片白色, 具绿色脉; 花瓣绿色, 具浓密的栗色疣状斑点; 唇瓣上部栗色或红褐色, 下部绿黄色并有栗色脉纹; 退化雄蕊浅黄绿色, 有绿色脉纹; 中萼片宽卵形, 长3.2—5.4 cm, 宽2.5—4.4 cm; 合萼片近椭圆形, 小于中萼片; 花瓣狭矩圆形或矩圆状倒披针形, 长5.4—7.3 cm, 宽1.5—2.4 cm, 边缘具缘毛; 唇瓣盔状, 内弯侧裂片上具疣状突起; 囊近卵形, 长3—4 cm, 宽2.3—3.2 cm; 退化雄蕊近马蹄形, 长、宽各8—12 mm, 上面被微柔毛。2n=40。

花期: 野外为1—4月。

分布: 缅甸、泰国东北部。

说明: 曾在泰国发现一个种下的白化型, 即黄花变型 *f. aureum* Van Delden ex Gruss (1999)。

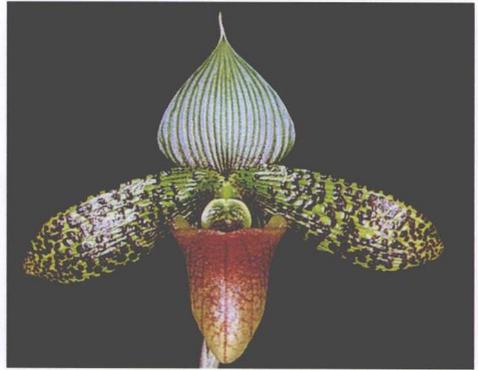


图 10-33. 苏氏兜兰

Fig. 10-33. *Paphiopedilum sukhakulii* Schoser & Senghas

Leaves 3—5(—8), narrowly oblong-elliptic, 10—25 cm long, 3—5 cm wide, adaxially tessellated with dark green and pale yellow-green, abaxially pale green. Scape 15—25 cm long, purple-brown, shortly white-hairy; bract ovate-lanceolate, 1.5—2.5 cm long, green, shortly hairy; pedicel and ovary 3.5—6 cm long, green, shortly hairy; flower single, 11—15 cm across; dorsal sepal and synsepal white, veined with green; petals green, heavily covered with maroon wart-like spots; lip maroon or red-brown in upper part, green-yellow and veined with maroon in lower part; staminode pale yellow-green, with green veins; dorsal sepal broadly ovate, 3.2—5.4 cm long, 2.5—4.4 cm wide; synsepal subelliptic, smaller than dorsal sepal; petals narrowly oblong or oblong-ob lanceolate, 5.4—7.3 cm long, 1.5—2.4 cm wide, ciliate; lip helmet-shaped, warted on its incurved side-lobes; pouch subovoid, 3—4 cm long, 2.3—3.2 cm wide; staminode somewhat horseshoe-shaped, 8—12 mm long and wide, puberulous adaxially. 2n=40.

Flowering period: January to April in the wild.

Distribution: Myanmar, NE Thailand.

Note: An albino form of this species, *f. aureum* Van Delden ex Gruss (1999), was described from Thailand.

34. 楼氏兜兰 (图10-34a) (Fig. 10-34a)

Paphiopedilum lowii (Lindl.) Stein, Orchideenbuch: 476. 1982.

Cypripedium lowii Lindl. in Gard. Chron.: 765. 1847.

Cordula lowii (Lindl.) Rolfe (as *C. lowiana*.)

叶4—6枚, 带状, 长25—40 cm, 宽3—6 cm, 上面绿色, 背面浅绿黄色。花葶长可达50—100 cm, 绿色, 有紫斑, 被短毛; 花序具3—7花; 苞片椭圆形, 长2.5—4.5 cm, 浅黄绿色, 常有紫斑, 被短柔毛; 花梗和子房长4.5—8 cm, 浅黄绿色而有紫色纵肋或整个紫色, 被短毛; 花直径11—16 cm; 中萼片与合萼片浅绿色或绿色, 略有暗色脉; 中萼片基部1/3处有暗紫色晕; 花瓣上半部紫色, 下半部浅绿色至浅绿黄色并有栗色斑点; 唇瓣浅绿褐色至浅紫褐色, 有暗色脉纹; 退化雄蕊乳黄色, 前半部中央有褐色斑块; 中萼片宽卵状椭圆形, 长3—5.5 cm, 宽2.5—3.5 cm, 基部边缘外弯; 合萼片椭圆形, 明显狭于中萼片; 花瓣匙形, 长5—7.5 (—9.3) cm, 宽1.5—3 cm, 边缘有缘毛; 唇瓣盔状; 囊近椭圆形, 长3—4 cm, 宽2—3 cm, 囊口两侧呈耳状; 退化雄蕊

倒卵形, 长约10 mm, 宽7 mm, 先端具弯缺和1个中央的长齿, 上面基部有1个具毛的钩状突起物。2n=26。

花期: 野外为4—6月。

分布: 印度尼西亚 (苏门答腊、爪哇、加里曼丹)、马来西亚 (马来半岛、沙捞越)。

说明: 该种共有2个变种被普遍承认: 婆罗洲的理查兜兰 (变种) *var. richardianum* (Asher & Beaman) Gruss & Roeth (1994) (图10-34b) (basionym: *P. richardianum* Asher & Beaman) 和林氏兜兰



图 10-34a. 楼氏兜兰

Fig. 10-34a. *Paphiopedilum lowii* (Lindl.) Stein

(变种) *var. lynniae* (Garay) Gruss & Roeth (1997) (图10-34c) (basionym: *P. lynniae* Garay)。前者与原变种 (*P. lowii* *var. lowii*) 的区别在于花较小, 中萼片不外弯, 花瓣更下垂以及唇瓣囊口前缘为深的V形; 后者与原变种的区别在于子房无毛和具有与上述变种相似的深V形的囊口前缘。此外, 还记载有一个黄花变型 *f. aureum* (P. J. Cribb) P. J. Cribb (1997)。

Leaves 4—6, lorate, 25—40 cm long, 3—6 cm wide, adaxially green, abaxially pale green. Scape up to 50—100 cm long, green, marked with purple, shortly-hairy; inflorescence with 3—7 flowers; bracts elliptic, 2.5—4.5 cm long, pale yellow-green, often marked with purple, pubescent; pedicel and ovary 4.5—8 cm long, pale yellow-green and longitudinally purple-

ridged or entirely purple, shortly hairy; flowers 11–16 cm across; dorsal sepal and synsepal pale green or green, obscurely darker-veined; dorsal sepal flushed with dull purple in basal one third; petals purple in apical half, pale green to pale green-yellow and maroon-spotted in basal half; lip pale green-brown to purple-brown, with darker veins; staminode cream, with a central brown blotch in apical half; dorsal sepal broadly ovate-elliptic, 3–5.5 cm long, 2.5–3.5 cm wide, basal margins recurved; synsepal elliptic, conspicuously narrower than dorsal sepal; petals spatulate, 5–7.5(–9.3) cm long, 1.5–3 cm wide, ciliate; lip helmet-shaped; pouch subellipsoid, 3–4 cm long, 2–3 cm wide, auriculate on both sides of its mouth; staminode obovate, ca. 10 mm long, 7 mm wide, with a sinus and a long central tooth apically, and a hairy hook-shaped protuberance at adaxial base. $2n=26$.

Flowering period: April to June in the wild.

Distribution: Indonesia (Sumatra, Java, Kalimantan), Malaysia (Malay Pen., Sarawak).

Note: Two varieties of this species are generally recognized: var. *richardianum* (Asher & Beaman) Gruss & Roeth (1994) (Fig. 10-34b) (basionym: *P. richardianum* Asher & Beaman) and var. *lynniae* (Garay) Gruss & Roeth (1997) (Fig. 10-34c) (basionym: *P. lynniae* Garay), both found in Borneo. The former differs from the typical variety (*P. lowii* var. *lowii*) in having smaller flowers with a non-decurved dorsal sepal, more pendent petals and a lip with a deeply V-shaped apex to the mouth; and the latter differs in having a glabrous ovary and a lip with a deeply V-shaped apex as above. Besides, there is a yellow-flowered form known to us: f. *aureum* (P. J. Cribb) P. J. Cribb (1997).



图 10-34b. 理查兜兰 (变种)
Fig. 10-34b. *Paphiopedilum lowii* var. *richardianum* (Asher & Beaman) Gruss & Roeth



图 10-34c. 林氏兜兰 (变种)
Fig. 10-34c. *Paphiopedilum lowii* var. *lynniae* (Garay) Gruss & Roeth

35. 黑氏兜兰 (图10-35) (Fig. 10-35)

Paphiopedilum haynaldianum (Rchb. f.) Stein, Orchideenbuch: 470. 1892.

Cypripedium haynaldianum Rchb. f., Xenia Orch. 2: 222. 1874.

Cordula haynaldiana (Rchb. f.) Rolfe

叶6—7枚, 带状, 长20—45 cm, 宽4.5—5 cm, 绿色。花葶外弯或近直立, 长35—75 cm, 紫褐色, 被长毛; 花序具3—6(—12)花; 苞片矩圆状披针形, 长2.1—4.6 cm, 绿黄色, 有紫色晕; 花梗和子房长4—6 cm, 常紫褐色, 被长柔毛; 花直径10—12 cm; 中萼片近白色, 中央浅黄绿色, 有浅紫红色的脉和晕, 沿脉有褐色粗斑点; 合萼片浅绿色, 基部有栗色斑点; 花瓣上半部浅紫色, 下半部浅绿黄色并有褐色粗斑点; 唇瓣土黄绿色, 有暗色脉; 退化雄蕊浅黄绿色, 有白色细斑点, 近先端有绿色斑; 中萼片近倒卵状椭圆形, 长3.5—6.2 cm, 宽3—4 cm, 基部边缘外弯; 合萼片近椭圆形, 小于中萼片; 花瓣匙形, 长6—9 cm, 宽1—2 cm, 半扭转, 边缘有缘毛; 唇瓣盔状; 囊倒卵形, 长2.5—3 cm, 宽2—2.3 cm, 囊口两侧呈耳状; 退化雄蕊倒卵形, 长约12 mm, 宽8 mm, 先端具切口, 上面基部具1个被短毛的角状突起。2n=26。

花期: 野外为1—3月。

分布: 菲律宾北部与南部。

说明: 该种下已知有一个白花变型 *f. album* Asher ex Gruss & Roeth (2000), 产于菲律宾。

Leaves 6–7, lorate, 20–45 cm long, 4.5–5 cm wide, green. Scape arching or suberect, 35–75 cm long, purple-brown, long-hairy; inflorescence with 3–6(–12) flowers; bracts oblong-lanceolate, 2.1–4.6 cm long, green-yellow, flushed with purple; pedicel and ovary 4–6 cm long, often purple-brown, villose; flowers 10–12 cm across; dorsal sepal whitish, pale yellow-green centrally, veined and flushed with purple-red, with large brown spots along the

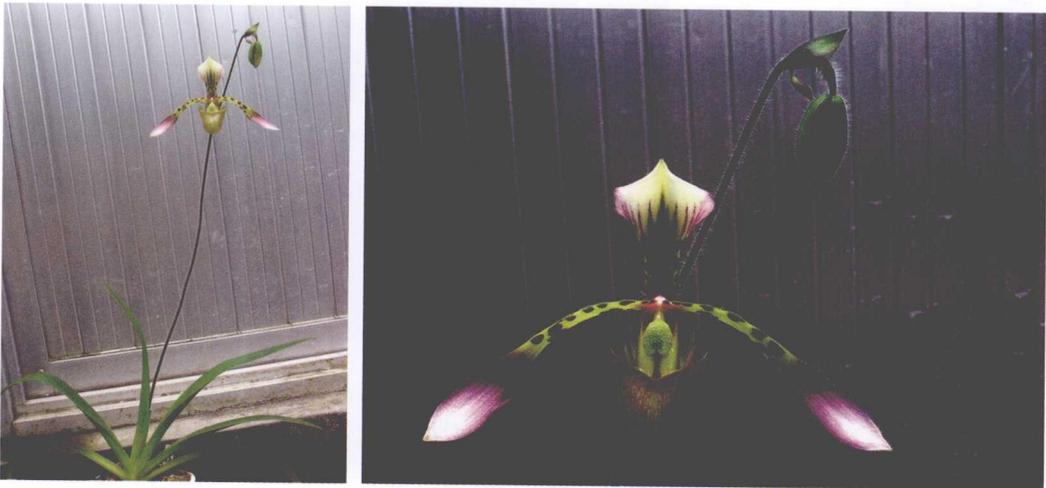


图 10-35. 黑氏兜兰

Fig. 10-35. *Paphiopedilum haynaldianum* (Rchb. f.) Stein

veins; synsepal pale green, maroon-spotted toward the base; petals pale purple in apical half, pale green-yellow and with large brown spots in basal half; lip ochre-green, with darker veins; staminode pale yellow-green, minutely white-spotted, with a green blotch toward its apex; dorsal sepal subobovate-elliptic, 3.5–6.2 cm long, 3–4 cm wide, basal margins recurved; synsepal subelliptic, smaller than dorsal sepal; petals spatulate, 6–9 cm long, 1–2 cm wide, half-twisted, ciliate; lip helmet-shaped; pouch obovoid, 2.5–3 cm long, 2–2.3 cm wide, auriculate on both sides of its mouth; staminode obovate, ca. 12 mm long, 8 mm wide, incised apically, with a puberulous horn-shaped protuberance at adaxial base. $2n=26$.

Flowering period: January to March in the wild.

Distribution: N to S Philippines.

Note: An albino form, f. *album* Asher ex Gruss & Roeth (2000), was described from the Philippines.

36. 苍叶兜兰 (图10-36a) (Fig. 10-36a)

Paphiopedilum glaucophyllum J. J. Smith in Bull. Inst. Bot. Buitenzorg 7: 1. 1900.

Cypripedium glaucophyllum (J. J. Smith) Masters

Cordula glaucophylla (J. J. Smith) Rolfe

Paphiopedilum victoria-regina (Sander) M. W. Wood subsp. *glaucophyllum* (J. J. Smith) M. W. Wood

叶4—6枚, 狭矩圆状椭圆形, 长20—29 cm, 宽4.5—5.5 cm, 上面浅蓝绿色或苍绿色, 背面浅绿色。花葶长20—25 (—40) cm, 深紫色, 被短柔毛; 花序具多花; 苞片卵形, 长1.5—1.8 cm, 绿色, 有紫色脉; 花梗与子房长4.5—6 cm, 绿色, 被短毛; 花依次展现, 同一时间仅1花或至多2花开放, 直径8—9 cm; 中萼片与合萼片中央黄绿色或绿褐色, 有暗色脉, 边缘乳白色或绿白色; 花瓣乳白色或绿白色, 有暗色脉, 具紫色粗斑点; 唇瓣粉红紫色, 有深紫色细斑点, 边缘浅黄色; 退化雄蕊下半部浅黄绿色, 上半部黑紫色或浅栗色; 中萼片宽卵形, 长2.8—3.3 cm, 宽约3 cm, 背面被短柔毛; 合萼片卵形, 明显小于中萼片; 花瓣线形, 长4.4—5 cm, 宽9—10 mm, 上半部扭转, 边缘有长缘毛; 唇瓣盔状; 囊近椭圆形, 下部稍膨大, 长约3 cm, 宽2 cm, 囊口两侧几乎不呈耳状; 退化雄蕊卵形, 长10—15 mm, 宽7—9 mm, 基部有紫色毛。 $2n=36, 37$ 。

花期: 野外为3—7月。

分布: 印度尼西亚 (爪哇)。

说明: 该种的变种莫氏兜兰 (变种) var. *moquetteanum* J. J. Smith (1906) (图



图 10-36a. 苍叶兜兰

Fig. 10-36a. *Paphiopedilum glaucophyllum* J. J. Smith

10-36b) [syn: *P. victoria-regina* var. *moquetteanum* (J. J. Smith) M. W. Wood; *P. moquetteanum* (J. J. Smith) Fowlie] 也产于爪哇, 为一些植物学家所承认。它与原变种 (*P. glaucophyllum* var. *glaucophyllum*) 的区别主要为中萼片具紫色细斑点以及叶与花的大小尺寸不同。我们认为作为此种的变型更好。此外, 在2001年还发表了一个新变型: 素心变型 f. *flavoviride* Braem。



图 10-36b. 莫氏兜兰 (变种)
Fig. 10-36b. *Paphiopedilum glaucophyllum* var. *moquetteanum* J. J. Smith

Leaves 4–6, narrowly oblong-elliptic, 20–29 cm long, 4.5–5.5 cm wide, adaxially bluish-green or glaucous, abaxially pale green. Scape 20–25(–40) cm long, deep purple, pubescent; inflorescence many-flowered; bracts ovate, 1.5–1.8 cm long, green, purple-veined; pedicel and ovary 4.5–6 cm long, green, shortly hairy; flowers produced successively, with one or at most two opening at a time, 8–9 cm across; dorsal sepal and synsepal yellow-green or green-brown, with darker veins centrally and whitish or greenish-white margins; petals whitish or greenish-white, with darker veins and large purple spots; lip pink-purple, finely spotted with deep purple, margins pale yellow; staminode pale yellow-green in basal half, black-purple or pale maroon in apical half; dorsal sepal broadly ovate, 2.8–3.3 cm long, ca. 3 cm wide, pubescent abaxially; synsepal ovate, conspicuously smaller than dorsal sepal; petals linear, 4.4–5 cm long, 9–10 mm wide, twisted in apical half, long-ciliate; lip helmet-shaped; pouch subellipsoid, slightly inflated in lower part, ca. 3 cm long, 2 cm wide, scarcely auriculate on both sides of its mouth; staminode ovate, 10–15 mm long, 7–9 mm wide, purple-hairy at base. $2n=36, 37$.

Flowering period: March to July in the wild.

Distribution: Indonesia (Java).

Note: Its sympatric variety, var. *moquetteanum* J. J. Smith (1906) (Fig. 10-36b) [syn: *P. victoria-regina* var. *moquetteanum* (J. J. Smith) M. W. Wood; *P. moquetteanum* (J. J. Smith) Fowlie], recognized by some botanists, differs from the typical variety (*P. glaucophyllum* var. *glaucophyllum*) mainly in its finely purple-spotted dorsal sepal, as well as the size of leaves and flowers. It is, in our opinion, best treated as a form of this species. In addition, *P. glaucophyllum* f. *flavoviride* Braem was described in 2001.

37. 李氏兜兰 (图10-37) (Fig. 10-37)

Paphiopedilum liemianum (Fowlie) Karas. & Saito in Bull. Hiroshima Bot. Gard. 5: 57. 1982.

Paphiopedilum chamberlainianum (Sander) Stein subsp. *liemianum* Fowlie in Orchid Digest 35: 55. 1971.

Paphiopedilum victoria-regina (Sander) M. W. Wood subsp. *liemianum* (Fowlie) M. W. Wood

Paphiopedilum chamberlainianum var. *liemianum* (Fowlie) Braem

叶4—7枚, 狭矩圆形或矩圆状椭圆形, 长10—24 cm, 宽3—5 cm, 上面绿色并有浅绿黄色晕, 背面具由紫点排成的横带, 边缘全部具明显的缘毛。花葶长15—25 cm, 紫色, 被微柔毛; 花序具多花; 苞片卵状椭圆形, 长1—1.7 cm, 绿色, 具紫色斑点; 花梗和子房长3—5 cm, 紫色, 被短毛; 花依次展现, 同一时间仅1花开放, 直径8—9 cm; 中萼片中央绿色并有暗色脉, 边缘近白色或近黄白色; 合萼片黄绿色有暗色脉; 花瓣近白色或近黄白色, 常有排成横带状的紫色斑; 唇瓣粉红紫色, 有深紫色细斑点, 边缘浅黄绿色; 退化雄蕊绿色, 先端2/3常为暗栗色; 中萼片宽卵形, 长2.8—3.8 cm, 宽2.4—4.4 cm, 有缘毛; 合萼片椭圆形, 小于中萼片; 花瓣线形或狭矩圆形, 长4—5 cm, 宽7—14 mm, 上半部扭转, 边缘具长缘毛; 唇瓣盔状; 囊近椭圆形, 下部稍膨大, 长3—3.5 cm, 宽2.3—2.8 cm, 囊口两侧几乎不呈耳状; 退化雄蕊近卵状四方形, 长、宽各9—11 mm, 基部被微柔毛。2n=32。



图 10-37. 李氏兜兰

Fig. 10-37. *Paphiopedilum liemianum* (Fowlie) Karas. & Saito

花期：野外为3—6月。

分布：印度尼西亚（苏门答腊）。

Leaves 4–7, narrowly oblong or oblong-elliptic, 10–24 cm long, 3–5 cm wide, adaxially green flushed with pale green-yellow, abaxially purple-spotted in transverse bands, conspicuously ciliate all along margins. Scape 15–25 cm long, purple, puberulous; inflorescence many-flowered; bracts ovate-elliptic, 1–1.7 cm long, green, spotted with purple; pedicel and ovary 3–5 cm long, purple, shortly hairy; flowers produced successively, only one opening at a time, 8–9 cm across; dorsal sepal green and with darker veins centrally, with whitish or yellowish-white margins; synsepal yellow-green, with darker veins; petals whitish or yellowish-white, often purple-marked in transverse bands; lip pink-purple, minutely purple-spotted, with pale yellow-green margins; staminode green, dark maroon in apical two thirds; dorsal sepal broadly ovate, 2.8–3.8 cm long, 2.4–4.4 cm wide, ciliate; synsepal elliptic, smaller than dorsal sepal; petals linear or narrowly oblong, 4–5 cm long, 7–14 mm wide, twisted in apical half, long-ciliate; lip helmet-shaped; pouch subellipsoid, slightly inflated in lower part, 3–3.5 cm long, 2.3–2.8 cm wide, scarcely auriculate on both sides of its mouth; staminode ovate-subsquare, 9–11 mm long and wide, puberulous at base. $2n=32$.

Flowering period: March to June in the wild.

Distribution: Indonesia (Sumatra).

38. 报春兜兰 (图10-38) (Fig. 10-38)

Paphiopedilum primulinum M. W. Wood & P. Taylor in Orchid Rev. 81: 220. 1973.

Paphiopedilum chamberlainianum (Sander) Stein subsp. *liemianum* Fowlie f. *primulinum* (M. W. Wood & Taylor) Fowlie

Paphiopedilum chamberlainianum subsp. *liemianum* f. *primulinum* var. *flavum* Fowlie, nom. illeg.

Paphiopedilum victoria-regina (Sander) M. W. Wood subsp. *primulinum* (M. W. Wood & P. Taylor) M. W. Wood

Paphiopedilum liemianum (Fowlie) Karas. & Saito var. *primulinum* (M. W. Wood & P. Taylor) Karas. & Saito

Paphiopedilum chamberlainianum var. *primulinum* (M. W. Wood & P. Taylor) Braem

叶4—7枚, 狭矩圆状椭圆形, 长达17 cm, 宽2.5—3.8 cm, 上面绿色, 背面浅绿色。花葶长25—30 cm, 绿色, 被短柔毛; 花序具多花; 苞片卵状椭圆形, 长约1.7 cm, 绿色; 花梗与子房长3.5—4.5 cm, 绿色, 被微柔毛; 花依次展现, 同一时间通常仅1花开放, 直径6.5—7 cm; 中萼片与合萼片绿黄色, 有深色脉; 花瓣与唇瓣黄色, 花瓣上有不甚明显的暗色脉; 退化雄蕊绿色; 中萼片宽卵形或近圆形, 长、宽各为2.5—3.5 cm, 背面被短柔毛; 合萼片卵形, 略狭于中萼片; 花瓣近平展, 线形, 向末端渐狭, 长3.1—4.2 cm, 宽6—12 mm, 上半部稍扭转而且边缘波状, 有长缘毛; 唇瓣盔状; 囊近椭圆形, 下部稍膨大, 长2.2—2.8 cm, 宽1.6—2 cm, 囊口两侧略呈耳状;



图 10-38. 报春兜兰

Fig. 10-38. *Paphiopedilum primulinum* M. W. Wood & P. Taylor

退化雄蕊近宽椭圆形，长6—8 mm，宽5—7 mm，基部被微柔毛。 $2n=32$ 。

花期：野外为3—6月。

分布：印度尼西亚（苏门答腊）。

说明：该种的变种浅紫兜兰（变种）var. *purpurascens* (M. W. Wood) P. J. Cribb (1987) [basionym: *P. victoria-regina* (Sander) M. W. Wood subsp. *primulinum* (M. W. Wood & P. Taylor) M. W. Wood f. *purpurescens* M. W. Wood] 也产于苏门答腊，与原变种（*P. primulinum* var. *primulinum*）的区别在于花瓣有紫色斑点，唇瓣有紫晕和叶背面基部有紫斑。该变种继后又降为报春兜兰的变型：*P. primulinum* f. *purpurascens* (M. W. Wood) Gruss (2002)。

Leaves 4–7, narrowly oblong-elliptic, to 17 cm long, 2.5–3.8 cm wide, adaxially green, abaxially pale green. Scape 25–30 cm long, green, pubescent; inflorescence many-flowered; bracts ovate-elliptic, ca. 1.7 cm long, green; pedicel and ovary 3.5–4.5 cm long, green, puberulous; flowers produced successively, commonly one opening at a time, 6.5–7 cm across; dorsal sepal and synsepal green-yellow, with deeper veins; petals and lip yellow; petals obscurely darker-veined; staminode green; dorsal sepal broadly ovate or suborbicular, 2.5–3.5 cm long and wide, pubescent abaxially; synsepal ovate, slightly narrower than dorsal sepal; petals almost spreading horizontally, linear-tapering, 3.1–4.2 cm long, 6–12 mm wide, slightly twisted and undulate-margined in apical half, long-ciliate; lip helmet-shaped; pouch subellipsoid, slightly inflated in lower part, 2.2–2.8 cm long, 1.6–2 cm wide, slightly auriculate on both sides of its mouth; staminode broadly subelliptic, 6–8 mm long, 5–7 mm wide, puberulous at base. $2n=32$.

Flowering period: March to June in the wild.

Distribution: Indonesia (Sumatra).

Note: Its variety, var. *purpurascens* (M. W. Wood) P. J. Cribb (1987) [basionym: *P. victoria-regina* (Sander) M. W. Wood subsp. *primulinum* (M. W. Wood & P. Taylor) M. W. Wood f. *purpurescens* M. W. Wood], is also a native of Sumatra. It differs from the typical variety (*P. primulinum* var. *primulinum*) in its purple-spotted petals, purple-flushed lip and the leaves flushed with purple at abaxial base. This variety was later treated as a form of this species: *P. primulinum* f. *purpurascens* (M. W. Wood) Gruss (2002).

39. 玛丽兜兰 (图10-39) (Fig. 10-39)

Paphiopedilum victoria-mariae (Sander ex Masters) Rolfe in Orchid Rev. 4: 364. 1896.

Cypripedium victoria-mariae Sander ex Masters in Gard. Chron. ser. 3, 13: 580. 1893.

Cypripedium chamberlainianum (Sander) Stein f. *victoria-mariae* (Sander ex Masters) Rolfe

Cordula victoria-mariae (Sander ex Masters) Rolfe

叶6—8枚, 狭矩圆形, 长达30 cm, 宽6.5 cm, 上面有深浅绿色相间的网格斑, 背面基部有紫色晕。花葶长达1 m以上, 紫色, 被毛; 花序具多花; 苞片椭圆形, 长约3 cm, 绿色; 花梗和子房长约6 cm, 绿色, 被毛; 花依次展现, 同一时间仅1朵或至多2朵开放, 直径8—9 cm; 中萼片中央亮绿色并有暗色脉, 边缘浅黄色; 合萼片浅绿色, 有暗色脉; 花瓣绿色, 有褐色至浅红紫色晕; 唇瓣紫红色, 有绿黄色边缘; 退化雄蕊深紫褐色, 基部与先端绿色; 中萼片宽卵形至近圆形, 长与宽各2.3—3.2 cm, 背面被长柔毛; 合萼片卵形, 小于中萼片; 花瓣线形, 长3.2—4 cm, 宽6—11 mm, 上半部扭转, 边缘具长缘毛; 唇瓣盔状; 囊卵状圆锥形, 长2.5—3 cm, 宽2—2.5 cm, 囊口两侧略呈耳状; 退化雄蕊宽卵形, 长约10 mm, 宽7 mm。2n=32, 36。

花期: 野外为3—5月。

分布: 印度尼西亚(苏门答腊)。

说明: 此种植物显然是独立的种, 虽然有学者将它归并入多花兜兰*P. victoria-regina* M. W. Wood.

Leaves 6—8, narrowly oblong, to 30 cm long, 6.5 cm wide, adaxially tessellated with



图 10-39. 玛丽兜兰

Fig. 10-39. *Paphiopedilum victoria-mariae* (Sander ex Masters) Rolfe

dark and light green, abaxially flushed with purple at base. Scape up to over 1 m long, purple, hairy; inflorescence many-flowered; bracts elliptic, ca. 3 cm long, green; pedicel and ovary ca. 6 cm long, green, hairy; flowers produced successively, only one or at most two opening at a time, 8–9 cm across; dorsal sepal bright green and with darker veins centrally, margins pale yellow; synsepal pale green, with darker veins; petals green, flushed with brown to pale red-purple; lip purple-red, margins green-yellow; staminode deep purple-brown, with a green base and apex; dorsal sepal broadly ovate to suborbicular, 2.3–3.2 cm long and wide, long-hairy abaxially; synsepal ovate, smaller than dorsal sepal; petals linear, 3.2–4 cm long, 6–11 mm wide, twisted in apical half, long-ciliate; lip helmet-shaped; pouch ovoid-conical, 2.5–3 cm long, 2–2.5 cm wide, slightly auriculate on both sides of its mouth; staminode broadly ovate, ca. 10 mm long, 7 mm wide. $2n=32, 36$.

Flowering period: March to May in the wild.

Distribution: Indonesia (Sumatra).

Note: This is obviously a distinct species, though some botanists treated it as a synonym of *P. victoria-regina* (Sander) M. W. Wood.

40. 多花兜兰 (图10-40) (Fig. 10-40)

Paphiopedilum victoria-regina (Sander) M. W. Wood in Orchid Rev. 84: 134. 1976.

Cypripedium victoria-regina Sander in Gard. Chron. ser. 3, 11: 194. 1892.

Cypripedium chamberlainianum O'Brien

Paphiopedilum chamberlainianum (O'Brien) Stein

Paphiopedilum chamberlainianum var. *latifolium* Schltr.

Cordula chamberlainiana (O'Brien) Rolfe

Paphiopedilum victoria-regina subsp. *chamberlainianum* (O'Brien) M. W. Wood

Paphiopedilum kalinae Braem

Paphiopedilum victoria-regina var. *kalinae* (Braem) Koop.

Paphiopedilum victoria-regina var. *latifolium* (Schltr.) Beckner



叶4—8枚, 狭矩圆形, 长达30—40 cm, 宽6—9.8 cm, 上面绿色, 背面基部具紫色晕。花萼长达60 cm, 紫色, 具白色短柔毛; 花序具多花; 苞片椭圆形, 长3—3.5 cm, 绿色; 花梗和子房长4—5 cm, 绿黄色, 有紫色纵肋, 被短柔毛; 花依次展现, 同一时间仅1—2朵开放, 直径8—10 cm; 中萼片和合萼片黄绿色至乳白色, 有黑紫色脉; 花瓣浅黄绿色, 有黑紫色斑点与斑块; 唇瓣粉红色至浅紫红色, 有紫色细斑点;



图 10-40. 多花兜兰

Fig. 10-40. *Paphiopedilum victoria-regina* (Sander) M. W. Wood

退化雄蕊绿色，上半部为黑栗色；中萼片宽卵形至近圆形，长、宽各2.6—4 cm，背面被长柔毛；合萼片卵形，窄于中萼片；花瓣水平伸展，近线形，长4—5.2 cm，宽7—12 mm，扭转，边缘具长缘毛；唇瓣盔状；囊近椭圆形，下部稍膨大，长2.5—3 cm，宽2—2.5 cm，囊口两侧略呈耳状；退化雄蕊宽卵形，长8—9 mm，宽约7 mm，近基部边缘被短毛。 $2n=30$ 。

花期：野外为3—7月。

分布：印度尼西亚（苏门答腊）。

Leaves 4–8, narrowly oblong, up to 30–40 cm long, 6–9.8 cm wide, adaxially green, abaxially flushed with purple toward the base. Scape up to 60 cm long, purple, white-pubescent; inflorescence many-flowered; bracts elliptic, 3–3.5 cm long, green; pedicel and ovary 4–5 cm long, green-yellow, longitudinally purple-ridged, pubescent; flowers produced successively, only one or two opening at a time, 8–10 cm across; dorsal sepal and synsepal yellow-green to whitish, with black-purple veins; petals pale yellow-green, spotted and marked with black-purple; lip pink to pale purple-red, minutely spotted with purple; staminode green, black-maroon in apical half; dorsal sepal broadly ovate to suborbicular, 2.6–4 cm long and wide, abaxially villose; synsepal ovate, narrower than dorsal sepal; petals spreading horizontally, sublinear, 4–5.2 cm long, 7–12 mm wide, twisted, long-ciliate; lip helmet-shaped; pouch subellipsoid, slightly inflated in lower part, 2.5–3 cm long, 2–2.5 cm wide, slightly auriculate on both sides of its mouth; staminode broadly ovate, 8–9 mm long, ca. 7 mm wide, shortly hairy along basal sides. $2n=30$.

Flowering period: March to July in the wild.

Distribution: Indonesia (Sumatra).

41. 菲律宾兜兰 (图10-41) (Fig. 10-41)

Paphiopedilum philippinense (Rchb. f.) Stein, Orchideenbuch: 480. 1892.

Cypripedium philippinense Rchb. f. in Bonplandia 10: 335. 1862.

Cypripedium laevigatum Bateman

Selenipedium laevigatum (Bateman) May

Cypripedium cannartianum Linden

Paphiopedilum laevigatum (Bateman) Pfitzer

Paphiopedilum philippinense (Rchb. f.) Stein var. *cannartianum* (Linden) Pfitzer

Cordula philippinensis (Rchb. f.) Rolfe

叶5—9枚, 狭矩圆形, 长15—25 (—50) cm, 宽2.5—5.5 cm, 质地厚, 上面绿色, 背面浅绿色。花葶长25—50 cm, 紫色, 被短柔毛; 花序具2—6花; 苞片卵状椭圆形, 长约5 cm, 宽2 cm, 红褐色, 被短柔毛; 花梗与子房长4.5—6.5 cm, 紫褐色, 被短柔毛; 花直径约8 cm, 几乎同时开放; 中萼片与合萼片乳白色, 具紫色或紫褐色脉; 花瓣基部乳白色或浅黄色, 向上变为栗色, 近基部边缘具被毛的暗栗色疣状突起; 唇瓣黄色; 退化雄蕊浅黄色, 有绿脉; 中萼片宽卵形, 长4—5 cm, 宽2—3 cm; 合萼片卵形, 明显小于中萼片; 花瓣近下垂, 丝带状, 向先端渐狭, 长12—16 cm, 宽5—7 mm, 扭转, 边缘有缘毛; 唇瓣盔状, 具很小的内弯侧裂片; 囊近卵形, 长2.3—



图 10-41. 菲律宾兜兰

Fig. 10-41. *Paphiopedilum philippinense* (Rchb. f.) Stein

2.8 cm, 宽1.4—1.9 cm; 退化雄蕊稍呈心形或近四方形, 长、宽各约8 mm, 先端微缺, 边缘被紫毛。2n=26。

花期: 野外为3—7月。

分布: 马来西亚(沙巴)、菲律宾。

说明: 此种变种罗氏兜兰(变种) var. *roebelenii* (Veitch) P. J. Cribb (1987) [basionym: *Cypripedium philippinense* Rchb. f. var. *roebelenii* Veitch; syn.: *Cypripedium roebelenii* (Veitch) Rchb. f.]产于吕宋, 与原变种(*P. philippinense* var. *philippinense*)的区别在于花较大, 花瓣长达17.5 cm。此外, 在2000年该种之下还发表了一个白黄花变型 f. *alboflavum* Gruss。

Leaves 5–9, narrowly oblong, 15–25(–50) cm long, 2.5–5.5 cm wide, thick-textured, adaxially green, abaxially pale green. Scape 25–50 cm long, purple, pubescent; inflorescence with 2–6 flowers; bracts ovate-elliptic, ca. 5 cm long, 2 cm wide, red-brown, pubescent; pedicel and ovary 4.5–6.5 cm long, purple-brown, pubescent; flowers ca. 8 cm across, opening almost at the same time; dorsal sepal and synsepal whitish, with purple or purple-brown veins; petals whitish or pale yellow toward the base, becoming maroon upward, with dark maroon hairy warts on basal margins; lip yellow; staminode pale yellow, green-veined; dorsal sepal broadly ovate, 4–5 cm long, 2–3 cm wide; synsepal ovate, conspicuously smaller than dorsal sepal; petals more or less pendulous, ribbon-like, tapering to apex, 12–16 cm long, 5–7 mm wide, twisted, ciliate; lip helmet-shaped, with much reduced incurved side-lobes; pouch subovoid, 2.3–2.8 cm long, 1.4–1.9 cm wide; staminode somewhat cordate or subsquare, ca. 8 mm long and wide, emarginate, purple-hairy on sides. 2n=26.

Flowering period: March to July in the wild.

Distribution: Malaysia (Sabah), Philippines.

Note: Its variety, var. *roebelenii* (Veitch) P. J. Cribb (1987) [basionym: *Cypripedium philippinense* Rchb. f. var. *roebelenii* Veitch; syn.: *Cypripedium roebelenii* (Veitch) Rchb. f.], is a native of Luzon. It differs from the typical variety (*P. philippinense* var. *philippinense*) by its larger flowers with longer petals up to 17.5 cm long. Besides, an albino form of this species, f. *alboflavum* Gruss, was described in 2000.

42. 然氏兜兰 (图10-42) (Fig. 10-42)

Paphiopedilum randsii Fowlie in Orchid. Digest 33: 321. 1969.

叶数枚，矩圆状椭圆形，长20—38 cm，宽5—6 cm，上面绿色，背面浅绿色。花葶长20—45 cm，紫色或红褐色，被毛；花序具2—6花；苞片卵形，长2.5—3 cm，绿色，有栗色脉，被毛；花梗与子房长2.5—3 cm，绿色，有栗色纵肋，被短毛；花直径5—7 cm，几乎同时开放；中萼片、合萼片与花瓣白色或绿白色，有栗色脉；唇瓣浅黄绿色，有暗色脉；退化雄蕊浅绿黄色，中央有绿色脉与晕；中萼片椭圆状卵形，长3.2—4.2 cm，宽1.7—2.2 cm；合萼片卵形，略小于中萼片；花瓣下弯，镰刀状，线状披针形，长3.7—4.6 cm，宽4—7 mm，边缘具缘毛；唇瓣盔状，具很小的内弯侧裂片；囊近矩圆形，长1.8—2.5 cm，宽1.2—1.5 cm；退化雄蕊近方形的倒卵形，长约5 mm，宽约4 mm，边缘被短柔毛。2*n*=26。

花期：野外为3—5月。

分布：菲律宾（棉兰老）。

Leaves several, oblong-elliptic, 20–38 cm long, 5–6 cm wide, adaxially green, abaxially pale green. Scape 20–45 cm long, purple or red-brown, hairy; inflorescence with 2–6 flowers; bracts ovate, 2.5–3 cm long, green, maroon-veined, hairy; pedicel and ovary 2.5–3 cm long, green, longitudinally maroon-ridged, shortly hairy; flowers 5–7 cm across, almost opening at the same time; dorsal sepal, synsepal and petals white or greenish-white, veined with maroon; lip pale yellow-green, with darker veins; staminode pale green-

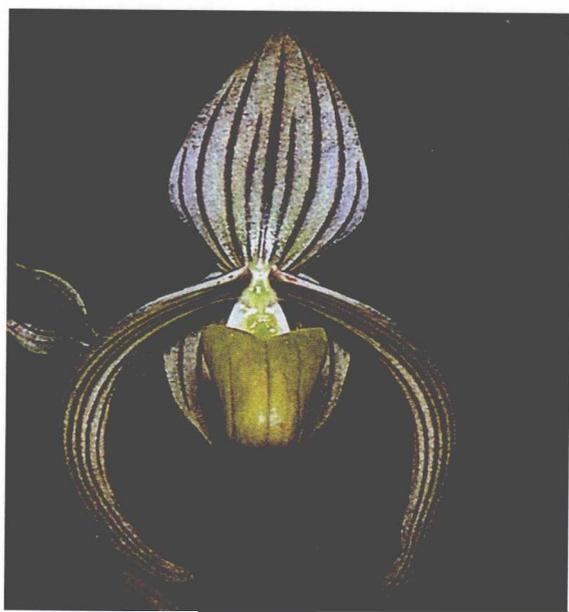


图 10-42. 然氏兜兰
Fig. 10-42. *Paphiopedilum randsii* Fowlie

yellow, veined and flushed with green centrally; dorsal sepal elliptic-ovate, 3.2–4.2 cm long, 1.7–2.2 cm wide; synsepal ovate, slightly smaller than dorsal sepal; petals deflexed, falcate, linear-lanceolate, 3.7–4.6 cm long, 4–7 mm wide, ciliate; lip helmet-shaped, with much reduced incurved side-lobes; pouch suboblong, 1.8–2.5 cm long, 1.2–1.5 cm wide; staminode subsquare-obovate, ca. 5 mm long, 4 mm wide, pubescent on sides. 2*n*=26.

Flowering period: March to May in the wild.

Distribution: Philippines (Mindanao).

43. 长须兜兰 (图10-43) (Fig. 10-43)

Paphiopedilum sanderianum (Rchb. f.) Stein, Orchideenbuch: 482. 1892.

Cypripedium sanderianum Rchb. f. in Gard. Chron. n. s., 25: 554. 1886.

Cordula sanderiana (Rchb. f.) Rolfe

叶4—6枚, 狭矩圆形, 长30—45 cm, 宽4.5—5.3 cm, 上面绿色, 背面有时在基部有紫色斑点。花葶长达60 cm, 紫色或红褐色, 被短毛; 花序具2—5花; 苞片椭圆状披针形, 长3.3—5 cm, 红褐色, 有暗色脉; 花梗和子房长达7 cm, 白色, 被短毛; 花直径约7 cm, 几乎同时开放; 中萼片与合萼片黄色, 有栗色纵条纹; 花瓣下半部乳白色或浅黄色并具栗色斑点与斑块, 上半部紫色或紫褐色; 唇瓣黄色或浅黄褐色, 有褐色脉; 退化雄蕊黄色, 常有褐色晕; 中萼片卵状披针形或宽披针形, 长4.2—6.5 cm, 宽1.2—2.5 cm, 背面被紫色短柔毛; 合萼片狭卵形, 稍小于中萼片; 花瓣下垂, 丝带状, 向先端渐狭, 扭转, 通常长30—60 cm, 罕有长达近1 m, 宽5—9 mm, 下半部具粗缘毛; 唇瓣盔状, 具很小的内弯侧裂片; 囊长2.5—3.5 cm, 宽1.5—2.5 cm; 退化雄蕊近矩圆形, 长10—13 mm, 宽7—9 mm, 基部具被毛的长柄。2n=26。

花期: 野外为7—12月。

分布: 印度尼西亚(加里曼丹)、马来西亚(沙捞越)。

Leaves 4–6, suboblong, 30–45 cm long, 4.5–5.3 cm wide, adaxially green, abaxially sometimes purple-spotted at base. Scape to 60 cm long, purple or red-brown, shortly hairy; inflorescence with 2–5 flowers; bracts elliptic-lanceolate, 3.3–5 cm long, red-brown, with darker veins; pedicel and ovary up to 7 cm long, white, shortly hairy; flowers ca. 7 cm across, opening almost at the same time; dorsal sepal and synsepal

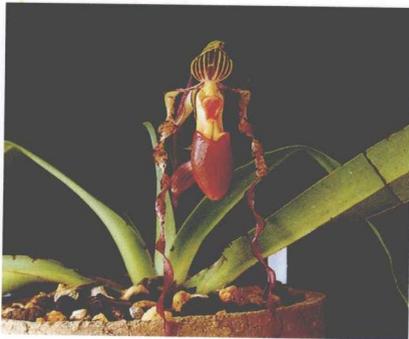
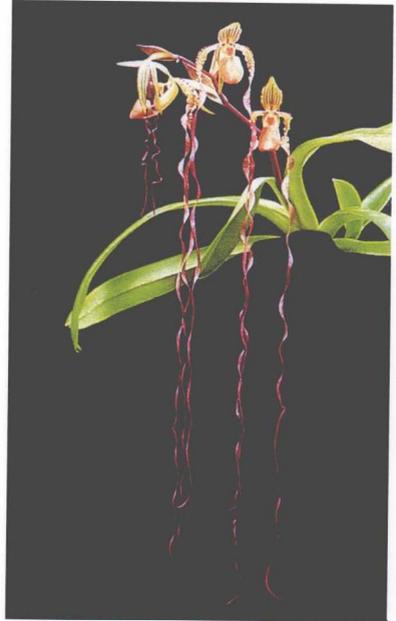


图 10-43. 长须兜兰

Fig. 10-43. *Paphiopedilum sanderianum* (Rchb. f.) Stein

yellow, longitudinally striped with maroon; petals whitish or pale yellow and with maroon spots and blotches in basal half, purple or purple-brown in apical half; lip yellow or pale yellow-brown, with brown veins; staminode yellow, often flushed with brown; dorsal sepal ovate-lanceolate or broadly lanceolate, 4.2–6.5 cm long, 1.2–2.5 cm wide, abaxially purple-pubescent; synsepal narrowly ovate, slightly smaller than dorsal sepal; petals pendulous, ribbon-like, tapering to apex, twisted, 30–60 cm or rarely up to about 1 m long, 5–9 mm wide, coarse-ciliate in basal half; lip helmet-shaped, with much reduced incurved side-lobes; pouch 2.5–3.5 cm long, 1.5–2.5 cm wide; staminode suboblong, 10–13 mm long, 7–9 mm wide, basally with a long hairy stalk. $2n=26$.

Flowering period: July to December in the wild.

Distribution: Indonesia (Kalimantan), Malaysia (Sarawak).

44. 巨叶兜兰 (图10-44) (Fig. 10-44)

Paphiopedilum gigantifolium Braem, M. Baker & C. Baker in Orchid. Cult. Protect. 30: 5. et 31: 34. 1997.

Paphiopedilum ayubii Hort. ex Parnata

叶数枚，带状，革质，长达60 cm，宽8—12 cm，上面绿色，背面浅绿色。花葶长达70 cm，绿色，被红褐色毛；花序通常具3—5花；苞片卵形，长达6.5 cm，褐色，背面密被短柔毛；花梗与子房略长于苞片，白色，被短柔毛；花直径约6 cm，长8—10 cm，几乎同时开放；中萼片黄绿色，下半部有3—5条栗色纵条纹；合萼片黄绿色，下部1/3处具2条栗色纵条纹；花瓣浅黄绿色，具红褐色斑点；唇瓣粉红褐色，有深色脉；退化雄蕊白色，边缘与先端浅黄色；中萼片卵形，长4—4.8 cm，宽约2.4 cm，背面密被红褐色刚毛；合萼片卵状椭圆形，略小于中萼片；花瓣下弯，线形，向先端渐狭，长7—10 cm，宽约1.1 cm，基部有红褐色毛；唇瓣盔状，具很小的内弯侧裂片；囊近宽卵形，长2.7—3 cm，宽2—2.3 cm，背面有纵槽；退化雄蕊近宽矩形，长约1.7 cm，宽1.4 cm，边缘有褐色刚毛。

花期：野外为4—6月。

分布：印度尼西亚（苏拉威西）。

Leaves several, lorate, coriaceous, to 60 cm long, 8–12 cm wide, adaxially green, abaxially pale green. Scape to 70 cm long, green, covered with red-brown hairs; inflorescence often with 3–5 flowers; bracts ovate, up to 6.5 cm long, brown, abaxially densely pubescent; pedicel and ovary slightly longer than bracts, white, pubescent; flowers ca. 6 cm across, 8–10 cm long, opening almost at the same time; dorsal sepal yellow-green, with 3–5 maroon longitudinal stripes in basal half; synsepal yellow-green, with 2 maroon longitudinal stripes in basal one third; petals pale yellow-green, with red-brown spots; lip pink-brown, with darker veins; staminode white, with pale yellow apex and sides; dorsal sepal ovate, 4–4.8 cm long, ca. 2.4 cm wide, abaxially densely covered with red-brown bristles; synsepal elliptic, slightly smaller than dorsal sepal; petals deflexed-pendent, linear-tapering, 7–10 cm long, ca. 1.1 cm wide, with red-brown hairs at base; lip helmet-shaped, with much reduced incurved side-lobes; pouch broad subovoid, 2.7–3 cm long, 2–2.3 cm wide, longitudinally grooved on back surface; staminode broadly suboblong, ca. 1.7 cm long, 1.4 cm wide, with brown bristles on sides.

Flowering period: April to June in the wild.

Distribution: Indonesia (Sulawesi).



图 10-44. 巨叶兜兰
Fig. 10-44. *Paphiopedilum gigantifolium* Braem, M. Baker & C. Baker

45. 柯氏兜兰 (图10-45) (Fig. 10-45)

Paphiopedilum kolopakingii Fowlie in *Orchid Digest* 48: 41. 1984.

Paphiopedilum topperi Braem & H. Mohr

Paphiopedilum kolopakingii f. *topperi* (Braem & Mohr) Braem & Chiron

叶8—12枚，带形，长40—60（—80）cm，宽5—12 cm，上面绿色，背面浅绿色。花葶长40—70（—95）cm，暗绿色，无毛；花序具5—15（—19）花；苞片卵状披针形，长3.5—5 cm，暗绿色，有紫色条纹；花梗和子房长4.2—6.5 cm，黄绿色，无毛；花几乎同时开放；中萼片与合萼片乳白色或浅黄绿色，有红褐色脉；花瓣绿色，有浅红褐色脉；唇瓣浅黄绿色或橄榄绿色，具暗色脉纹；退化雄蕊浅黄色；中萼片卵形，长5—6.5 cm，宽2.2—3.5 cm，背面被微柔毛；合萼片卵状椭圆形，略小于中萼片；花瓣下弯，线形，向先端渐狭，常稍弧曲，长5—7（—11）cm，宽6—11 mm；唇瓣盔状，具很小的内弯侧裂片；囊近宽卵形，长2—3 cm，宽1—2（—3）cm，背面有纵槽；退化雄蕊矩圆形，长9—15 mm，宽5—10 mm，边缘具褐色毛。 $2n=26$ 。

花期：野外为7—9月。

分布：印度尼西亚（加里曼丹）。



图 10-45. 柯氏兜兰

Fig. 10-45. *Paphiopedilum kolopakingii* Fowlie

Leaves 8–12, lorate, 40–60(–80)cm long, 5–12 cm wide, adaxially green, abaxially pale green. Scape 40–70(–95) cm long, dark green, glabrous; inflorescence with 5–15(–19) flowers; bracts ovate-lanceolate, 3.5–5 cm long, dark green, striped with purple; pedicel and ovary 4.2–6.5 cm long, yellow-green, glabrous; flowers almost opening at the same time; dorsal sepal and synsepal whitish or pale yellow-green, veined with red-brown; petals green, with pale red-brown veins; lip pale yellow-green or olive-green, with darker veins; staminode pale yellow; dorsal sepal ovate, 5–6.5 cm long, 2.2–3.5 cm wide, abaxially puberulous; synsepal ovate-elliptic, slightly smaller than dorsal sepal; petals deflexed, linear-tapering, often subfalcate, 5–7(–11) cm long, 6–11 mm

wide; lip helmet-shaped, with much reduced incurved side-lobes; pouch broadly subovoid, 2–3 cm long, 1–2(–3) cm wide, longitudinally grooved on back surface; staminode oblong, 9–15 mm long, 5–10 mm wide, with brown hairs on sides. $2n=26$.

Flowering period: July to September in the wild.

Distribution: Indonesia (Kalimantan).

46. 斯通兜兰 (图10-46) (Fig. 10-46)

Paphiopedilum stonei (Hook.) Stein, Orchideenbuch: 487. 1892.

Cypripedium stonei Hook. in Curtis's Bot. Mag. 88: t. 5349. 1862.

Cypripedium platytaenium Rchb. f.

Cypripedium stonei var. *acrosepalum* Rolfe

Cypripedium stonei var. *candidum* Masters

Cypripedium stonei var. *cannartianum* Rolfe

Cordula stonei (Hook.) Rolfe

Paphiopedilum stonei subsp. *stictopetalum* M. W. Wood

叶5—6枚, 狭矩圆形, 长25—70 cm, 宽3—5 (—8.5) cm, 上面绿色, 背面浅绿色。花葶长35—60 cm, 浅紫色, 无毛; 花序具2—5花; 苞片披针形, 长3.5—5.5 cm, 绿色, 有褐色脉和晕, 无毛; 花梗和子房长4—7 cm, 绿色, 有带紫色的纵肋, 无毛; 花直径10—12 cm, 几乎同时开放; 中萼片与合萼片白色, 有暗栗色纵条纹; 花瓣浅黄色, 具暗栗色条纹与斑点, 向先端常变为暗栗色; 唇瓣浅紫红色, 有深色脉纹; 退化雄蕊浅黄色; 中萼片宽卵形, 长4.5—6.4 cm, 宽约4.2 cm; 合萼片与中萼片相似, 但较小; 花瓣向下弯垂, 线形, 向先端渐狭, 长12—15 cm, 宽4—7.5 (—20) mm, 有时上半部扭转; 唇瓣盔状, 具很小的内弯侧裂片; 囊长2.5—3 cm, 宽2—2.5 cm; 退化雄蕊近矩圆形, 长约1.4 cm, 宽1.1 cm, 先端微缺, 两侧边缘被刚毛。2n=26。

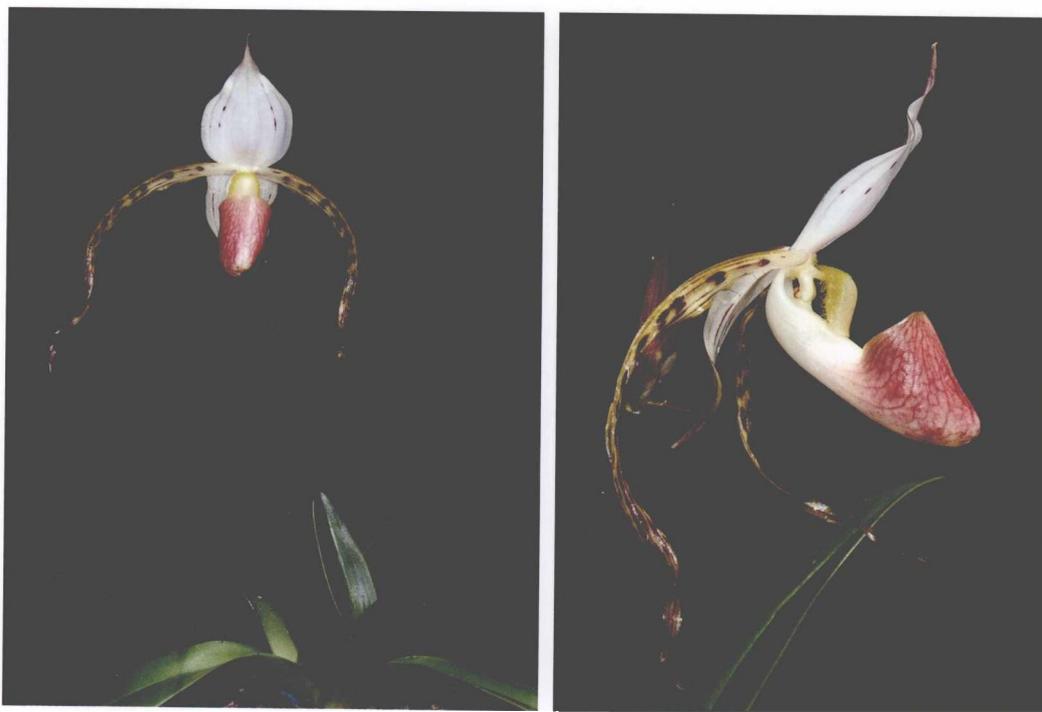


图 10-46. 斯通兜兰

Fig. 10-46. *Paphiopedilum stonei* (Hook.) Stein

花期：野外为5—7月。

分布：文莱、印度尼西亚（加里曼丹）、马来西亚（沙捞越）。

说明：这是一个变异幅度很大的种。种下发表了许多变种。但它们很可能是天然杂种或者只是变型或栽培品种。植物学家对于如何处理它们意见并不一致。例如，*Cypripedium platytaenium* Rchb. f. 被J. A. Fowlie (1975) 认为是本种和*P. hookerae*之间的杂种，而P. J. Cribb (1998)则认为与*P. stonei*是同一种。此外，我们认为新近发表的阔叶兜兰*P. platyphyllum* Yukawa [in *Die Orchidee* 52 (1): 84. 2001]很可能是该种与柯氏兜兰 (*P. kolopakingii*) 之间的天然杂种，虽然它已于2002年被J. M. H. Shaw作为该种的变种。

Leaves 5–6, narrowly oblong, 25–70 cm long, 3–5 (–8.5) cm wide, adaxially green, abaxially pale green. Scape 35–60 cm long, pale purple, glabrous; inflorescence with 2–5 flowers; bracts lanceolate, 3.5–5.5 cm long, green, veined and flushed with brown; pedicel and ovary 4–7 cm long, green, longitudinally purplish-ribbed, glabrous; flowers 10–12 cm across, almost opening at the same time; dorsal sepal and synsepal white, longitudinally striped with dark maroon; petals pale yellow, striped and spotted with dark maroon, often entirely becoming dark maroon in apical part; lip pale purple-red, with darker veneration; staminode pale yellow; dorsal sepal broadly ovate, 4.5–6.4 cm long, ca. 4.2 cm wide; synsepal similar to dorsal sepal, but smaller; petals deflexed-pendent, linear-tapering, 12–15 cm long, 4–7.5 (–20) mm wide, sometimes twisted in apical half; lip helmet-shaped, with much reduced incurved side-lobes; pouch 2.5–3 cm long, 2–2.5 cm wide; staminode suboblong, ca. 1.4 cm long, 1.1 cm wide, emarginate apically, bristly on margins. $2n=26$.

Flowering period: May to July in the wild.

Distribution: Brunei Darussalam, Indonesia (Kalimantan), Malaysia (Sarawak).

Note: This is a quite variable species, of which many varieties have been published. Probably they are natural hybrids or only forms or cultivars. Botanists have a difference of opinion on how to treat them. For example, *Cypripedium platytaenium* Rchb. f. was considered by J. A. Fowlie (1975) to be a hybrid of *P. stonei* and *P. hookerae*, while by P. J. Cribb (1998) to be conspecific with *P. stonei*. Besides, *P. platyphyllum* Yukawa [in *Die Orchidee* 52 (1): 84. 2001] is, in our opinion, a natural hybrid between this species and *P. kolopakingii*, though it was treated by J. M. H. Shaw as a variety of this species in 2002.

47. 苏岛兜兰 (图10-47) (Fig. 10-47)

Paphiopedilum intaniae Cavestro in Rhône-Alpes Orchid. 25: 5. 2000.

叶4—7枚, 狭矩圆形, 长25—40 cm, 宽4.5—6 cm, 上面绿色, 背面浅绿色。花葶直立, 长35—50 cm; 花序柄被褐色毛; 花序具3—8花; 苞片长2.3—2.5 cm, 浅褐色, 具栗色脉, 被毛; 花梗和子房长约3.6 cm, 被密毛; 花直径10—12 cm, 几乎同时开放; 中萼片与侧萼片白色, 基部绿白色, 有褐色纵条纹; 花瓣白色或绿白色, 下半部具褐色斑点, 上半部有褐色条纹和斑块; 唇瓣浅黄色, 有浅褐色晕和褐色网纹; 退化雄蕊浅绿色至浅黄色, 中央有绿色网斑, 两侧白色; 中萼片卵状披针形, 长4.4—4.8 cm, 宽1.6—1.9 cm; 合萼片略小于中萼片; 花瓣线形, 向先端渐狭, 长6.5—7 cm, 宽4—5 mm, 下半部边缘具4—6个被毛的疣状体; 唇瓣盔状, 具很小的内弯侧裂片; 囊卵形, 长3—3.5 cm, 宽1.6—1.8 cm; 退化雄蕊宽矩圆形, 长8—9 mm, 宽5—6 mm, 先端有凹缺, 基部边缘有缘毛。

花期: 园中栽培为4月。

分布: 印度尼西亚 (苏拉威西)。

Leaves 4—7, narrowly oblong, 25—40 cm long, 4.5—6 cm wide, adaxially green, abaxially pale green. Scape erect, 35—50 cm long; peduncle brown-hairy; inflorescence with 3—8 flowers; bracts 2.3—2.5 cm long, pale brown, maroon-veined; pedicel and ovary ca. 3.6 cm long, densely hairy; flowers 10—12 cm across, opening almost at the same time; dorsal sepal and synsepal white, greenish-white basally, with brown longitudinal stripes; petals white or greenish-white, brown-spotted in basal half, striped and marked with brown in apical half; lip pale yellow, flushed with pale brown and reticulated with brown; staminode pale green to pale yellow, reticulated with green centrally, white on either side; dorsal sepal ovate-lanceolate, 4.4—4.8 cm long, 1.6—1.9 cm wide; synsepal slightly smaller than dorsal sepal; petals linear-tapering, 6.5—7 cm long, 4—5 mm wide, margins with 4—6 hairy warts in basal half; lip helmet-shaped, with much reduced incurved side-lobes; pouch ovoid, 3—3.5 cm long, 1.6—1.8 cm wide; staminode broadly oblong, 8—9 mm long, 5—6 mm wide, emarginate apically, ciliate on basal margins.

Flowering period: April in cultivation.

Distribution: Indonesia (Sulawesi).

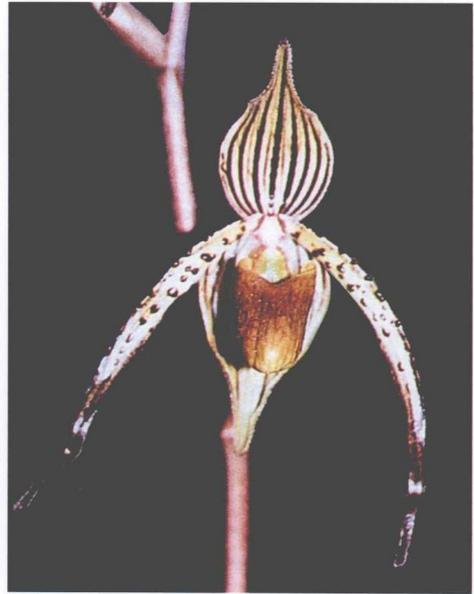


图 10-47. 苏岛兜兰

Fig. 10-47. *Paphiopedilum intaniae* Cavestro

48. 棉岛兜兰 (图10-48) (Fig. 10-48)

Paphiopedilum adductum Asher in Orchid Digest 47: 224. 1983.

Paphiopedilum anitum Golamco.

Paphiopedilum adductum var. *anitum* (Golamco) Koop.

叶5—6枚, 狭矩圆形或舌状矩圆形, 长20—35 cm, 宽3.7—4.5 cm, 上面暗绿色, 具透明的叶缘, 背面浅绿色。花葶长30—40 cm, 紫褐色, 被短柔毛; 花序具2—3花, 有时可达5花; 苞片狭卵状披针形, 长3—4 cm, 宽约1.3 cm, 绿色, 有栗色脉; 花梗和子房长3.5—5 cm, 浅绿褐色, 有暗紫褐色纵肋; 花直径6—9 cm, 几乎同时开放; 中萼片与合萼片浅绿黄色或绿白色, 有栗色粗条纹, 背面浅褐色; 花瓣下半部浅黄色并有栗色斑点, 上半部完全栗色; 唇瓣浅黄色, 前方表面有紫褐色脉纹; 退化雄蕊浅黄色; 中萼片与合萼片卵形, 长4.5—7 cm, 宽2.3—3.5 cm, 背面有微柔毛; 花瓣向下弯垂, 线形, 向先端渐狭, 长8—15 cm, 宽7—9 mm, 先端被细毛; 唇瓣盔状, 具很小的内弯侧裂片; 囊长2.5—3 cm, 宽1.5—2.2 cm, 背面有纵槽; 退化雄蕊几乎直立, 不遮盖柱头与雄蕊, 近矩圆形, 长8—9 mm, 宽5—7 mm, 先端2裂, 边缘具细毛。2n=26。

花期: 园中栽培为4—5月。

分布: 菲律宾(棉兰老)。



图 10-48. 棉岛兜兰
Fig. 10-48. *Paphiopedilum adductum* Asher

说明: 线瓣兜兰(杂种) (*Paphiopedilum* × *mandanaense* Golamco) (in Waling Waling Rev. 7: 24. 1999) 产于菲律宾棉兰老岛, 被认为是 *P. anitum* (即棉岛兜兰 *P. adductum*) 和华丽兜兰 (*P. superbiens*) 之间的天然杂种。但后者只见于苏门答腊, 与线瓣兜兰(杂种)的家乡相距甚远。因而我们认为该实体最好作为棉岛兜兰的一个变种。

Leaves 5—6, narrowly oblong or ligulate-oblong, 20—35 cm long, 3.7—4.5 cm wide, adaxially dark green, hyaline-margined, abaxially pale green. Scape 30—40 cm long, purple-brown, pubescent; inflorescence with 2—3 (—5) flowers; bracts narrowly ovate-lanceolate, 3—4 cm long, ca. 1.3 cm wide, green, maroon-veined;

pedicel and ovary 3.5–5 cm long, pale green-brown, longitudinally purple-brown-ribbed; flowers 6–9 cm across, almost opening at the same time; dorsal sepal and synsepal pale green-yellow or greenish-white, with broad maroon stripes, pale brown abaxially; petals pale yellow spotted with maroon in basal half, completely maroon in apical half; lip pale yellow, with purple-brown veneration on front surface; staminode pale yellow; dorsal sepal and synsepal ovate, 4.5–7 cm long, 2.3–3.5 cm wide, puberulous abaxially; petals deflexed-pendent, linear-tapering, 8–15 cm long, 7–9 mm wide, minutely hairy apically; lip helmet-shaped, with much reduced incurved side-lobes; pouch 2.5–3 cm long, 1.5–2.2 cm wide, longitudinally grooved on back surface; staminode suberect, not covering stigma and stamens, suboblong, 8–9 mm long, 5–7 mm wide, bilobed apically, minutely hairy on sides. $2n=26$.

Flowering period: April and May in cultivation.

Distribution: Philippines (Mindanao).

Note: *Paphiopedilum* × *mandanaense* Golamco (in *Waling Waling* Rev. 7: 24. 1999), a native of Mindanao Island, was considered to be a natural hybrid of *P. anitum* (= *P. adductum*) and *P. superbiens*. The latter, however, is restricted to Sumatra, an island far away from the home of *Paphiopedilum* × *mandanaense*. In our opinion, this entity is best treated as a variety of *P. adductum*.

49. 疣点兜兰 (图10-49) (Fig. 10-49)

Paphiopedilum glanduliferum (Bl.) Stein, Orchideenbuch: 468. 1892.

Cypripedium glanduliferum Bl. in Rumphia 4: 56, t. 195. 1848.

Cypripedium gardineri Guillemard

Cypripedium praestans Rchb. f.

Cypripedium praestans Rchb. f. var. *kimballianum* Linden & Rodigas

Paphiopedilum gardineri (Guillemard) Pfitzer

Paphiopedilum praestans (Rchb. f.) Pfitzer

Paphiopedilum praestans var. *kimballianum* (Linden & Rodigas) Pfitzer

Cordula glandulifera (Blume) Rolfe

Cordula praestans (Rchb. f.) Rolfe

Paphiopedilum glanduliferum var. *praestans* (Rchb. f.) Braem

Paphiopedilum glanduliferum var. *kimballianum* (Linden & Rodigas) Fowlie

叶4—6枚, 狭矩圆形, 长40—60 cm, 宽3—5.5 cm, 上面绿色, 背面浅绿色。花萼长可达50 cm, 紫色或绿褐色, 被短毛; 花序具2—5花; 苞片卵形或卵状披针形, 长2.5—4.5 cm, 无毛, 浅黄绿色, 有紫褐色脉; 花梗和子房长5—7 cm, 浅黄绿色, 有紫褐色纵纹, 无毛或被疏毛; 花直径在12 cm以上, 几乎同时开放; 中萼片、合萼



图 10-49. 疣点兜兰

Fig. 10-49. *Paphiopedilum glanduliferum* (Bl.) Stein

片与花瓣浅黄色或乳白色，具栗色脉；唇瓣与退化雄蕊浅黄绿色或浅褐红色，有深色脉纹；中萼片与合萼片卵形，长5—5.5 cm，宽2.5—2.9 cm；花瓣下弯，线形，向先端渐狭，长9—13 cm，宽0.5—1 cm，扭转，近基部边缘有黑色疣状突起；唇瓣盔状，具很小的内弯侧裂片；囊长2.5—3 cm，宽约2 cm；退化雄蕊近矩圆形，长约1.7 cm，宽1.2 cm，先端具短尖，两侧边缘具硬毛。 $2n=26$ 。

花期：野外为5—6月。

分布：印度尼西亚（新几内亚岛西部及邻近岛屿）。

Leaves 4–6, narrowly oblong, 40–60 cm long, 3–5.5 cm wide, adaxially green, abaxially pale green. Scape to 50 cm long, purple or green-brown, shortly hairy; inflorescence with 2–5 flowers; bracts ovate or ovate-lanceolate, 2.5–4.5 cm long, glabrous, pale yellow-green, veined with purple-brown; pedicel and ovary 5–7 cm long, pale yellow-green, longitudinally striped with purple-brown, glabrous or sparsely hairy; flowers over 12 cm across, almost opening at the same time; dorsal sepal, synsepal and petals pale yellow or whitish, maroon-veined; lip and staminode pale yellow-green or pale brown-red, with darker veneration; dorsal sepal and synsepal ovate, 5–5.5 cm long, 2.5–2.9 cm wide; petals deflexed, linear-tapering, 9–13 cm long, 0.5–1 cm wide, twisted, with black warts on basal margins; lip helmet-shaped, with much reduced incurved side-lobes; pouch 2.5–3 cm long, 2 cm wide; staminode suboblong, ca. 1.7 cm long, 1.2 cm wide, apiculate apically, hirsute on both sides. $2n=26$.

Flowering period: May and June in the wild.

Distribution: Indonesia (West New Guinea and adjacent Isl.).

50. 皱瓣兜兰 (图10-50) (Fig. 10-50)

Paphiopedilum ooi Koop. in *Orchid Digest* 63 (2): 106. 1999.

叶通常6枚, 矩圆状披针形, 长54—71 cm, 宽6—7 cm, 上面绿色, 背面浅绿色。花葶长可达近2 m; 花序柄粗可达1.5 cm, 疏被短毛; 花序具4—12花; 苞片近椭圆状卵形, 长约4 cm; 花梗和子房长达7.5 cm, 无毛; 花几乎同时开放; 中萼片浅黄绿色, 具15—17条暗紫褐色、粗约1 mm的纵条纹; 合萼片浅绿色, 具紫色纵脉纹; 花瓣牙黄色或浅黄绿色, 中央有1—2条紫色条纹, 边缘栗紫色, 近先端绿色; 唇瓣绿褐色; 退化雄蕊黄白色; 中萼片宽卵状椭圆形或近圆形, 长约3 cm, 宽2.9 cm, 边缘稍波状; 侧萼片长约3 cm, 宽2 cm; 花瓣线形, 多少下垂, 长达6.2 cm, 宽约7 mm, 下侧边缘强烈皱波状; 唇瓣盔状, 具很小的内弯侧裂片; 囊长2.5—4 cm, 宽1.5—2 cm; 退化雄蕊近矩圆形, 长约1.4 cm, 宽9 mm, 先端2裂, 基部边缘有短毛。

花期: 园中栽培为1月。

分布: 马来西亚。

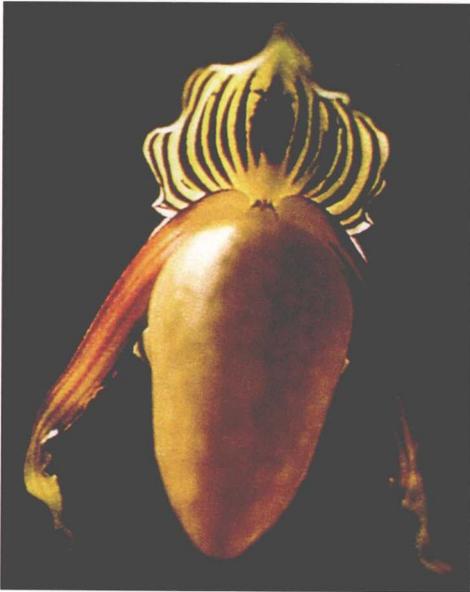


图 10-50. 皱瓣兜兰

Fig. 10-50. *Paphiopedilum ooi* Koop.

Leaves often 6, oblong-lanceolate, 54–71 cm long, 6–7 cm wide, adaxially green, abaxially pale green. Scape up to nearly 2 m long; peduncle to 1.5 cm thick, sparsely short-hairy; inflorescence with 4–12 flowers; bracts subelliptic-ovate, ca. 4 cm long; pedicel and ovary to 7.5 cm long, glabrous; flowers opening almost at the same time; dorsal sepal pale yellow-green, with 15–17 dark purple-brown longitudinal stripes ca. 1 mm thick; synsepal pale green, longitudinally veined with purple; petals ivory cream or ivory-green, margins maroon-brown, green apically, with 1–2 purple longitudinal stripes; lip greenish-brown; staminode yellow-whitish; dorsal sepal broadly ovate-elliptic or suborbicular, ca. 3 cm

long, 2.9 cm wide, slightly undulate-margined; synsepal ca. 3 cm long, 2 cm wide; petals linear, more or less pendent, to 6.2 cm long, ca. 7 mm wide, strongly crisped on the margin of the lower side; lip helmet-shaped, with much reduced incurved side-lobes; pouch 2.5–4 cm long, 1.5–2 cm wide; staminode suboblong, ca. 1.4 cm long, 9 mm wide, bifid apically, short-villose on basal margins.

Flowering period: January in cultivation.

Distribution: Malaysia.

51. 威后兜兰 (图10-51) (Fig. 10-51)

Paphiopedilum wilhelminiae L. O. Williams in Amer. Orchid Soc. Bull. 10: 373, t. 12. 1942.

Paphiopedilum praestans (Rchb. f.) Pfitzer subsp. *wilhelminiae* (L. O. Williams) M. W. Wood

Paphiopedilum glanduliferum (Bl.) Stein var. *wilhelminiae* (L. O. Williams) P. J. Cribb

Paphiopedilum striatum M. A. Clem. & D. L. Jones

Paphiopedilum praestans var. *wilhelminiae* (L. O. Williams) Braem

叶4—6枚，狭矩圆形，长达27 cm，宽2—3.5 cm，上面暗绿色，背面浅绿色。花茎长30—50 cm，紫色或浅绿褐色，被短毛；花序具(1—)2—3花；苞片卵形，长约4.5 cm，无毛；花梗和子房长5—7 cm，无毛或被疏毛；花直径达10—12(—16) cm，几乎同时开放；中萼片和合萼片乳白色至浅黄色，有栗色脉；花瓣浅黄色，下部有暗栗色脉，向上变为栗色；唇瓣浅黄色或浅褐色，有暗色脉；退化雄蕊粉红色，基部黄色；中萼片与合萼片卵形，长4.9—5.5 cm，宽2.5—2.9 cm；花瓣下弯，扭转，线形，向先端渐狭，长5—7 cm，宽约1 cm，先端具乳突，在近基部边缘偶见疣状突起；唇瓣盔状，具很小的内弯侧裂片；囊长2.5—3 cm，宽约2 cm；退化雄蕊近方形，长约1.2 cm，宽1—1.2 cm，两侧边缘具浅褐色毛。 $2n=26$ 。

花期：野外为夏季。

分布：新几内亚岛（印度尼西亚和巴布亚新几内亚）。

说明：该种被Braem(1988)作为疣点兜兰*P. glanduliferum*的异名，后来又被他和C. & M. Baker归入*P. praestans*作异名。P. J. Cribb(1998)视此两种为同种，但承认*P. wilhelminiae*为独立的种。本书采用P. J. Cribb的观点。当然，对疣点兜兰复合体做进一步研究是必要的。

Leaves 4–6, narrowly oblong, to 27 cm long, 2–3.5 cm wide, adaxially dark green, abaxially pale green. Scape 30–50 cm long, purple or pale green-brown, shortly hairy; inflorescence with (1–)2–3 flowers; bracts ovate, ca. 4.5 cm long, glabrous; pedicel and ovary 5–7 cm long, glabrous or sparsely hairy; flowers 10–12(–16) cm across, opening almost at the same time; dorsal sepal and synsepal whitish to pale yellow, veined with maroon; petals pale yellow, veined with dark maroon in lower part, becoming maroon above; lip pale yellow or pale brown, with darker veins; staminode pink, with a yellow base;



图 10-51. 威后兜兰
Fig. 10-51. *Paphiopedilum wilhelminiae*
L. O. Williams

dorsal sepal and synsepal ovate, 4.9–5.5 cm long, 2.5–2.9 cm wide; petals deflexed, twisted, linear-tapering, 5–7 cm long, ca. 1 cm wide, papillose in apical part, occasionally with a few marginal warts toward the base; lip helmet-shaped, with much reduced incurved side-lobes; pouch 2.5–3 cm long, ca. 2 cm wide; staminode subsquare, ca. 1.2 cm long, 1–1.2 cm wide, with pale brown hairs on both sides. $2n=26$.

Flowering period: Summer in the wild.

Distribution: New Guinea Island (Indonesia and Papua New Guinea).

Note: This species was treated by Braem (1988) as a synonym of *P. glanduliferum* (Bl.) Stein, and then by him and C. & M. Baker (1998) as a synonym of *P. praestans* (Rchb. f.) Pfitzer. P. J. Cribb (1998) considered both *P. glanduliferum* and *P. praestans* to be conspecific with each other, but recognized *P. wilhelminiae* as a distinct species. P. J. Cribb's treatment is adopted here. Of course, a further investigation is needed on the *P. glanduliferum* complex.

52. 若氏兜兰 (图10-52) (Fig. 10-52)

Paphiopedilum rothschildianum (Rchb. f.) Stein, Orchideenbuch: 482. 1892.

Cypripedium rothschildianum Rchb. f. in Gard. Chron. ser. 3, 3: 457. 1888.

Cypripedium elliottianum O'Brien

Cypripedium neo-guineense Linden

Paphiopedilum elliottianum (O'Brien) Stein

Paphiopedilum rothschildianum (Rchb. f.) Stein var. *elliottianum* (O'Brien) Pfitzer

Cordula rothschildiana (Rchb. f.) Rolfe

叶6—8枚, 线形或带状, 长20—30(—60) cm, 宽4—5 cm, 上面绿色, 背面浅绿色。花葶长40—60 cm, 紫色, 被短毛; 花序具2—5花; 苞片卵状椭圆形, 长约5.5 cm, 浅黄绿色, 有紫色脉; 花梗和子房长达7.5 cm, 浅绿色, 有栗色纵肋, 无毛; 花直径15—20(—30) cm, 几乎同时开放; 中萼片与合萼片乳白色或浅黄色, 有栗色粗脉; 花瓣乳白色或浅黄色, 有栗色脉与斑点; 唇瓣黄色, 有浓密的紫色晕和脉纹; 退化雄蕊浅紫色, 中央黄色; 中萼片宽卵形, 长5.4—6.8 cm, 宽3.5—4.8 cm; 合萼片宽卵形, 略小于中萼片; 花瓣线状披针形, 长10—14 cm, 宽约1 cm, 边缘有缘毛, 近先端有乳突; 唇瓣盔状, 具很小的内弯侧裂片; 囊长3—3.5 cm, 宽2—2.5 cm; 退化雄蕊略呈狭卵状矩圆形, 中部屈膝状, 长1.4—1.6 cm, 宽4—5 mm, 先端2裂, 边缘与基部密生腺毛。2n=26。

花期: 园中栽培为4—6月。

分布: 马来西亚(沙巴)。

说明: 肯巴兜兰(杂种) [*Paphiopedilum* × *kimballianum* (Rchb. f) Rolfe] (in *Orchid Rev.* 4: 366. 1896) 被认为是该种和沙巴兜兰 (*P. dayanum*) 之间的天然杂种, 产于婆罗洲。

Leaves 6—8, linear or lorate, 20—30(—60) cm long, 4—5 cm wide, adaxially green,



图 10-52. 若氏兜兰

Fig. 10-52. *Paphiopedilum rothschildianum* (Rchb. f.) Stein

abaxially pale green. Scape 40–60 cm long, purple, shortly hairy; inflorescence with 2–5 flowers; bracts ovate-elliptic, ca. 5.5 cm long, pale yellow-green, veined with purple; pedicel and ovary to 7.5 cm long, pale green, longitudinally maroon-ribbed, glabrous; flowers 15–20 (–30) cm across, almost opening at the same time; dorsal sepal and synsepal whitish or pale yellow, thickly maroon-veined; petals whitish or pale yellow, veined and spotted with maroon; lip yellow, heavily flushed and veined with purple; staminode pale purple, with a yellow center; dorsal sepal broadly ovate, 5.4–6.8 cm long, 3.5–4.8 cm wide; synsepal broadly ovate, slightly smaller than dorsal sepal; petals linear-lanceolate, 10–14 cm long, ca. 1 cm wide, ciliate, papillose toward the apex; lip helmet-shaped, with much reduced incurved side-lobes; pouch 3–3.5 cm long, 2–2.5 cm wide; staminode somewhat narrowly ovate-oblong, geniculate in the middle, 1.4–1.6 cm long, 4–5 mm wide, bifid apically, densely glandular-hairy on margins and at base. $2n=26$.

Flowering period: April to June in cultivation.

Distribution: Malaysia (Sabah).

Note: *Paphiopedilum* × *kimballianum* (Rchb. f) Rolfe (in *Orchid Rev.* 4: 366. 1896), a natural hybrid between this species and *P. dayanum*, was described from Borneo.

53. 曲蕊兜兰 (图10-53) (Fig. 10-53)

Paphiopedilum supardii Braem & Loeb in Die Orchidee 36 (4): 142. 1985.

叶7—9枚，狭矩圆形，长35—60 cm，宽约5.5 cm，上面暗绿色，背面浅绿色。花葶长50—60 cm，紫色，无毛；花序具3—7花；苞片椭圆形，长约5.2 cm，浅黄绿色，有深色脉；花梗和子房常略短于苞片，浅紫褐色，无毛；花几乎同时开放；中萼片与合萼片浅黄绿色或黄白色，有暗褐色或栗色粗脉；花瓣浅黄白色，有栗色斑点；唇瓣红褐色，有深色脉纹，下部与背面白色或浅黄色；退化雄蕊黄色，两侧红褐色；中萼片卵形，长3.5—5.5 cm，宽约2.5 cm；合萼片卵形，略狭于中萼片；花瓣下弯，线形，向先端渐狭，常呈镰状弯曲，长8—9 cm，宽7—9 mm，扭转；唇瓣盔状，具很小的内弯侧裂片；囊长2—2.5 cm，宽1.5—1.8 cm；退化雄蕊近矩圆形，中部屈膝状，前面观近方形，长约8 mm，宽8—9 mm，基部有柄，先端2裂，两侧与基部被红褐色毛。 $2n=26$ 。

花期：野外为5—6月。

分布：印度尼西亚（加里曼丹）。

Leaves 7–9, narrowly oblong, 35–60 cm long, ca. 5.5 cm wide, adaxially dark green, abaxially pale green. Scape 50–60 cm long, purple; inflorescence with 3–7 flowers; bracts elliptic, ca. 5.2 cm long, pale yellow-green, with darker veins; pedicel and ovary often slightly shorter than the bracts, pale purple-brown; flowers opening almost at the same time; dorsal sepal and synsepal pale yellow-green or yellow-white, with dark brown or maroon thick veins; petals yellow-white, spotted with maroon; lip red-brown, with darker veneration, white or pale yellow in lower part and on back surface; staminode yellow, red-brown on both sides; dorsal sepal ovate, 3.5–5.5 cm long, ca. 2.5 cm wide; synsepal ovate, slightly narrower than dorsal sepal; petals deflexed, linear-tapering, often falcate, 8–9 cm long, 7–9 mm wide, twisted; lip helmet-shaped, with much reduced incurved side-lobes; pouch 2–2.5 cm long, 1.5–1.8 cm wide; staminode suboblong, geniculate in the middle, subsquare in front view, ca. 8 mm long, 8–9 mm wide, stalked at base, bilobed apically, with red-brown hairy on both sides and at base. $2n=26$.

Flowering period: May and June in the wild.

Distribution: Indonesia (Kalimantan).



图 10-53. 曲蕊兜兰

Fig. 10-53. *Paphiopedilum supardii* Braem & Loeb

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