

哀牢山兜兰，中国兰科一新天然杂种

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摘要: 报道了中国云南省兰科(Orchidaceae)兜兰属(*Paphiopedilum*)一新天然杂交种: 哀牢山兜兰(*Paphiopedilum* × *ailaoshanense* B. Liu & S. P. Chen)。哀牢山兜兰与白旗兜兰(*P. spicerianum*)和沧源兜兰(*P. gratixianum* var. *cangyuanense*)近缘, 与前者区别在于哀牢山兜兰花梗和子房有毛, 中萼片带紫色晕以及紫色斑点, 花瓣上侧暗绿色带紫色晕, 下侧黄绿色; 与后者区别在于中萼片具1条宽阔的紫褐色中带, 退化雌蕊紫色。哀牢山兜兰与天然杂种泸水兜兰(*Paphiopedilum* × *lushuiense*)相似, 而哀牢山兜兰的中萼片下部边缘不后卷, 近基部具紫红色晕, 合萼片具2条明显紫色粗脉, 花瓣匙形, 上边缘波状, 长6.0~6.2 cm, 唇瓣长5.0~5.5 cm。为厘清哀牢山兜兰, 沧源兜兰及白旗兜兰之间的关系, 基于3个叶绿体基因片段(*matK*、*rbcL*、*trnL*), 构建了兜兰属部分植物系统发育树。鉴于形态和分子数据, 认为哀牢山兜兰是天然杂交种。凭证标本存放于福建农林大学标本馆。

关键词: 兰属; 哀牢山兜兰; 兰科; 云南; 新天然杂交种

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Paphiopedilum × *ailaoshanense*, A New Natural Hybrid Species of Orchidaceae from China

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Abstract: A new natural hybrid species, *Paphiopedilum* × *ailaoshanense* B. Liu & S. P. Chen, from Yunnan Province, China, is reported, it is related to its parents *P. spicerianum* and *P. gratixianum* var. *cangyuanense*. It is different from the former by hairy pedicel and ovary, purple halo and purple spots in dorsal sepal, dark green upper petal with purple halo, and yellowish green lower petal; and from the latter by a broad purple-brown midvein in middle sepals and purple pistil. The new natural hybrid was similar to the natural hybrid *P.* × *lushuiense*, however, the lower edge of dorsal sepal of *P.* × *ailaoshanense* is not retrorbed, with purplish red halo near base, synsepal with 2 distinct purple thick veins, petal spatulate, upper edge wavy, 6.0–6.2 cm long, lip length 5.0–5.5 cm, obviously different. In order to clarify the relationship among *P.* × *ailaoshanense*, *P. spicerianum* and *P. gratixianum* var. *cangyuanense*, the phylogenetic tree of some *Paphiopedilum* was constructed based on three chloroplast gene sequences (*matK*, *rbcL* and *trnL*). In consideration of the morphological and molecular evidence, *Paphiopedilum* × *ailaoshanense* is identified as a natural hybrid. The vouchers are kept in the herbarium of Fujian Agriculture and Forestry University (FAFU).

Key words: *Paphiopedilum*; *P.* × *ailaoshanense*; Orchidaceae; Yunnan; New natural hybrid species

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兜兰属(*Paphiopedilum*)为热带亚洲植物, 全世界记录的野生种共有 79 种, 而中国的兜兰达 27 种, 约占 1/3, 是目前世界上兜兰属植物种类最丰富的国家, 其中已知的天然杂种达 10 种之多。兜兰属植物以热带地区为分布中心, 广泛分布于东南亚、喜马拉雅低地以及中国西南部, 少数分布于新几内亚及所罗门群岛, 主要生于地面或附生于岩石表面及岩缝中, 少数附生于树上, 叶近基生, 二列排于短茎上, 短茎完全包藏于叶基内^[1]。

2018 年 12 月在云南省沧源县哀牢山进行植物调查时, 我们于一块面积较大的石灰岩石壁上发现了与沧源兜兰(*P. gratrixianum* var. *cangyuanense*)相似的兜兰居群, 此兜兰与沧源兜兰混生, 其中沧源

兜兰约 10 000 株, 而哀牢山兜兰仅存在 2 株。通过查阅资料^[1-2], 与沧源兜兰(*P. gratrixianum* var. *cangyuanense*)、白旗兜兰(*P. spicerianum*)、泸水兜兰(*P. ×lushuiense*)等进行比对(表 1), 发现此兜兰与以上兜兰都存在明显的不同点: 与沧源兜兰不同在于中萼片有一条宽阔的紫褐色中带, 雄蕊为紫色; 与白旗兜兰不同在于花梗和子房有毛, 中萼片具紫色晕及斑点, 且花瓣上侧暗绿色带紫色晕, 下侧黄绿色; 与泸水兜兰不同在于中萼片下部边缘不后卷, 近基部具紫红色晕, 合萼片具 2 条明显紫色粗脉, 花瓣匙形, 上边缘波状。对哀牢山兜兰, 沧源兜兰及白旗兜兰进行 DNA 提取, 选用 3 个叶绿体基因片段(*matK*、*rbcL*、*trnL*)进行 PCR 扩增, 读取

表 1 哀牢山兜兰与白旗兜兰、沧源兜兰比较

Table 1 Comparison between the holotype of *Paphiopedilum ×ailaoshanense*, *P. spicerianum* and *P. gratrixianum* var. *cangyuanense*

	哀牢山兜兰 <i>P. ×ailaoshanense</i>	白旗兜兰 <i>P. spicerianum</i>	沧源兜兰 <i>P. gratrixianum</i> var. <i>cangyuanense</i>
叶 Leaf	3~4, 18~34 cm ×2~3.5 cm	3~4, 14~30 cm ×1.8~2.5(6) cm	3~4, 18~40(52) cm ×3~4 cm
花序 Inflorescence	花葶长 19~22 cm, 花单朵 Scape 19~22 cm with single flower	花葶长 12~22(~30) cm, 花单朵或 罕 2 朵 Scape 12~22(~30) cm, with single or very rarely two flowers	花葶长 22~25 cm, 花单朵 Scape 22~25 cm with single flower
花色 Flower color	白色至黄绿色, 唇瓣黄绿色带紫褐色 晕及脉纹 White to yellow-green, lip yellow-green, tinged and veined with purple-brown	白色至浅绿色, 唇瓣浅绿色或浅黄 褐色带暗色脉 White to pale-green, lip pale green-brown or pale yellow-brown with dark veins	白色至黄紫色, 唇瓣黄色带栗色脉纹 White yellow-purple, lip yellow, tinged and veined with chestnut
中萼片 Dorsal sepal	白色带紫色的晕及斑点, 具 1 条宽阔 的紫褐色中带, 下部边缘不后卷, 长 3~5 cm, 宽 3.2~6.5 cm White with purplish halo, speckle and a broad purple-brown band, lower edge not curled back, 3~5 cm ×3.2~6.5 cm	白色带栗色中脉, 基部浅绿色, 长 2.8~4.9 cm, 宽 3.2~4.1 cm White with chestnut midvein, base light green, 2.8~4.9 cm ×3.2~4.1 cm	白色带栗色斑块基部浅黄色, 长 5~5.3 cm, 宽 2.9~3.1 cm White with chestnut plaques, base yellow, 5~ 5.3 cm ×2.9~3.1 cm
合萼片 Synsepal	黄绿色带 2 条明显的紫色脉纹 Yellow-green with 2 distinct purple veins	浅黄绿色或白绿色 Pale yellow-green or white-green	浅黄色带栗色的带及斑点 Pale yellow with chestnut band and spots
花瓣 Petal	匙形, 具栗色中脉, 中脉上侧暗绿色 带紫色晕, 下侧黄绿色, 长 6~6.2 cm, 宽 2~2.6 cm Spatulate, with a broad maroon midrib, on its upper side dark-green with purple halo, on its lower side yellow-green, 6~6.2 cm ×2~2.6 cm	狭匙形或狭矩圆形, 浅黄绿色, 具紫 色中脉带浅色细斑点, 长 2.6~ 5.2 cm, 宽 0.6~1.8 cm Narrow spatulate or narrow moment round, yellow-green, a purple midrib with pale colored spots 2.6~5.2 cm × 0.6~1.8 cm	匙形, 具浅栗色中脉, 中脉上侧浅栗色, 下侧浅 黄色带栗色斑点, 长 5.5 cm, 宽 2~2.4 cm Spatulate, a pale chestnut midrib, on its upper side pale chestnut, on its lower side yellow with chestnut spots, 5.5 cm ×2~2.4 cm
唇瓣 Lip	黄绿色带紫褐色晕及脉纹, 长 5~ 5.5 cm, 宽 1.8~2.6 cm Yellow-green with purple-brown halo and veins, 5~5.5 cm ×1.8~2.6 cm	浅绿色或浅黄褐色带暗色脉, 长 2~2.3 cm, 宽 1.8~2.8 cm Pale green or pale yellow-brown with dark veins, 2~2.3 cm ×1.8~2.8 cm	黄色带栗色脉纹, 长 3 cm, 宽 2 cm Yellow with chestnut veins, 3 cm ×2 cm
退化雌蕊 Staminode	紫色, 长约 1.3 cm, 宽约 1.3 cm, 中央 有 1 个绿色的、不凸起的脐状物 Purple, ca. 1.3 cm long, 1.3 cm wide, with a green, not raised umbo centrally	白色, 长约 1 cm, 宽约 0.6~0.7 cm, 基部边缘上卷, 貌似一对眼睛 White, ca. 1 cm long, 0.6~0.7 cm wide, obtuse at apex, basal margins involute and looking like a pair of eyes	浅黄色, 长约 1.3~1.4 cm, 宽约 1.1~1.3 cm, 中 央有一个浅黄色的、不凸起的脐状物 Pale-yellow, ca. 1.3~1.4 cm long, 1.1~1.3 cm wide, with a pale yellow, not raised umbo centrally
花期 Flowering	11 月 November	9~11 月 September~November	1~2 月 January~February

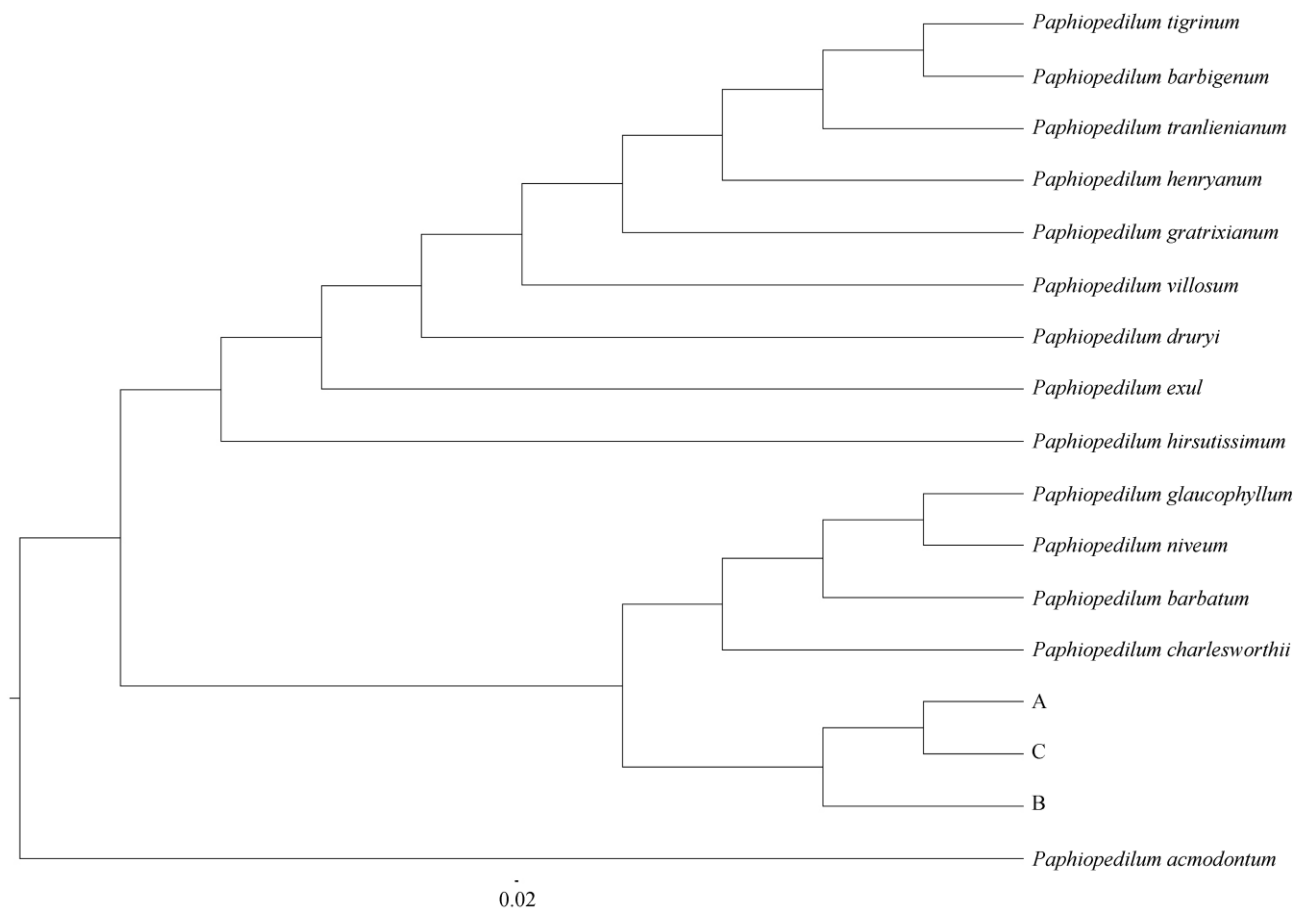


图 1 基于叶绿体基因序列构建的系统发育树。A: 哀牢山兜兰; B: 白旗兜兰; C: 沧源兜兰。

Fig. 1 Phylogenetic tree based on chloroplast gene sequences (*matK*, *rbcL*, *trnL*). A: *Paphiopedilum xailaoshanense*; B: *P. spicerianum*; C: *P. gratrixianum* var. *cangyuanense*.

并拼接序列^[3]。从 GeneBank 上下载兜兰属 14 种植物对应的叶绿体基因片段, 使用最大似然法完成系统发育分析(图 1), 由系统发育树可以看出哀牢山兜兰与沧源兜兰及白旗兜兰近缘。结合形态与分子的证据, 认定此兜兰为中国兜兰属一新天然杂交种: *Paphiopedilum xailaoshanense*, 拟名为哀牢山兜兰, 并予以报道。

哀牢山兜兰(新拟) 图 2, 3

Paphiopedilum xailaoshanense B. Liu & S. P. Chen, hybr. nat. nov.

Type: China, Yunnan, Cangyuan county, Ailao Mountain, in cracks of rocky under forest, alt. ca. 2000 m, 20 November, 2018, B. Liu FAFU1020 (holotype, NOCC!)

叶 3~4 枚, 带形至狭矩圆状椭圆形, 长 18~34 cm, 宽 2.0~3.5 cm, 先端急尖或略 2 浅裂, 上面

暗绿色, 背面浅绿色, 基部有紫红色斑点, 沿基部边缘稍波状; 花葶近直立, 长 19~22 cm, 紫色, 疏被带褐色短柔毛; 苞片长 3.0~3.5 cm, 浅黄绿色, 带紫色斑点, 背面具栗色中脉, 无毛; 花梗与子房长 3.8~5.5 cm, 紫褐色, 疏被紫褐色短柔毛; 花单朵, 直径 9~12 cm; 中萼片具 1 条宽阔的紫褐色中带, 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, 基部有紫色斑点; 合萼片黄绿色, 具 2 条明显的紫色脉纹; 花瓣具栗色中脉, 中脉上侧暗绿色带紫色晕, 下侧黄绿色, 基部有紫色斑点, 疏被紫色柔毛; 唇瓣黄绿色, 有紫褐色晕和脉纹; 退化雌蕊紫色; 中萼片宽卵状圆形至横椭圆形, 向前俯倾, 下部边缘不后卷, 长 2.8~5 cm, 宽 3.2~6.5 cm, 两面生白色短柔毛; 合萼片明显小于中萼片; 花瓣匙形, 长 6~6.2 cm, 宽 2.0~2.6 cm, 下缘后卷; 唇瓣盔状; 囊长 5.0~5.5 cm, 宽 1.8~2.6 cm, 囊口两侧耳状; 退化雄蕊倒卵状四方形, 长

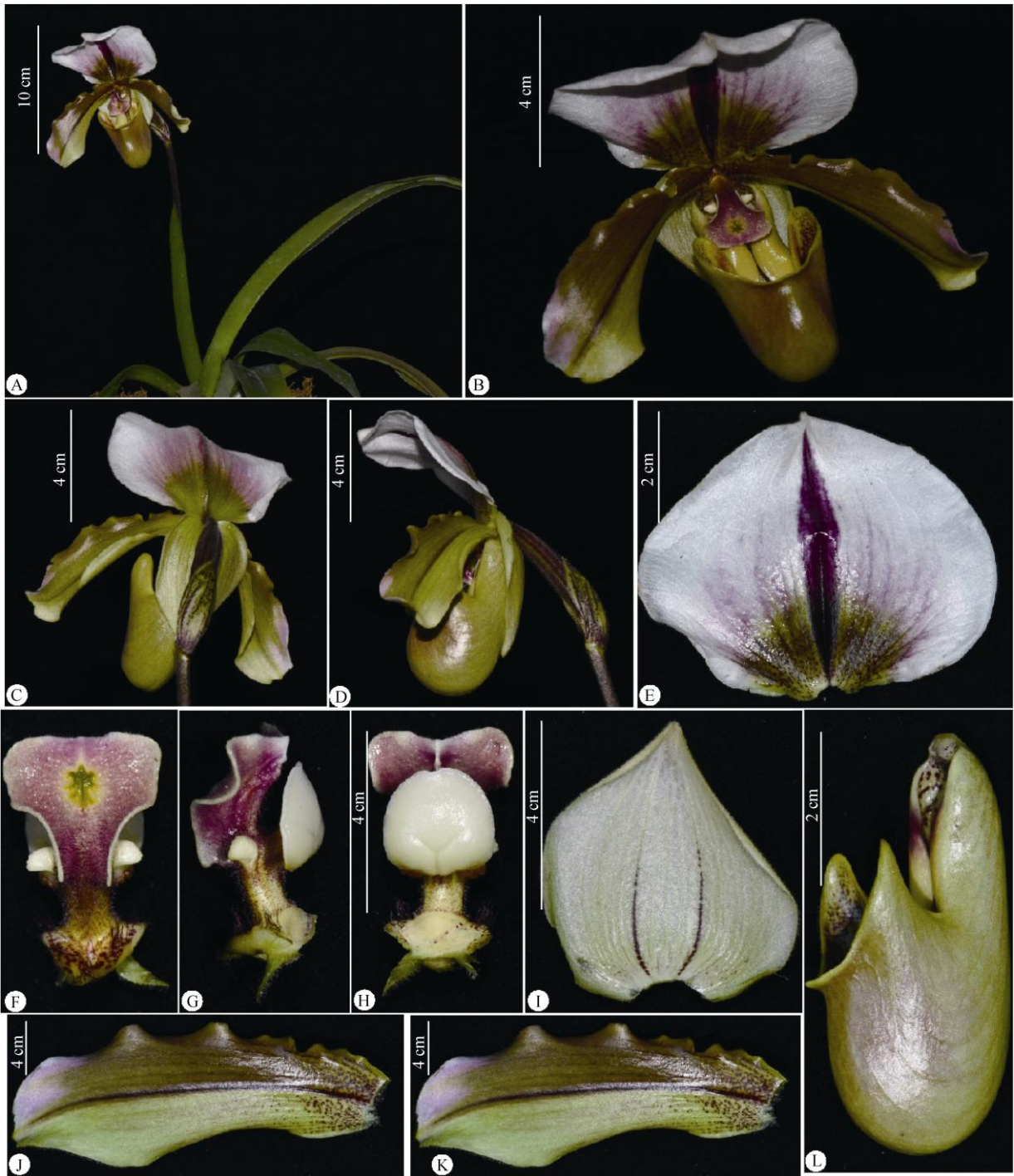


图2 哀牢山兜兰。A: 开花植物; B: 花, 正面观; C: 花, 背面观; D: 花, 侧面观; E: 中萼片; F: 合蕊柱, 正面观; G: 合蕊柱, 背面观; H: 合蕊柱, 侧面观; I: 合萼片; J: 花瓣, 正面观; K: 花瓣, 背面观; L: 唇瓣, 侧面观。

Fig. 2 *Paphiopedilum xailaoshanense*. A: Flowering plant; B: Flower, front view; C: Flower, dorsal view; D: Flower, lateral view; E: Dorsal sepal; F: Staminode, front view; G: Staminode, dorsal view ; H: Staminode, lateral view; I: Synsepal; J: Petal, front view; K: Petal, dorsal view; L: Lip, lateral view.

约 1.3 cm, 宽 1.3 cm, 中央有 1 个绿色的、不凸起的脐状物。

花期: 11 月。

分布: 云南西南部(沧源县)。

生境: 林下多石之地。

亲本: 哀牢山兜兰被视为白旗兜兰(*P. spicerianum*)和沧源兜兰(*P. gratrixianum* var. *cangyuanense*)之间的天然杂种。

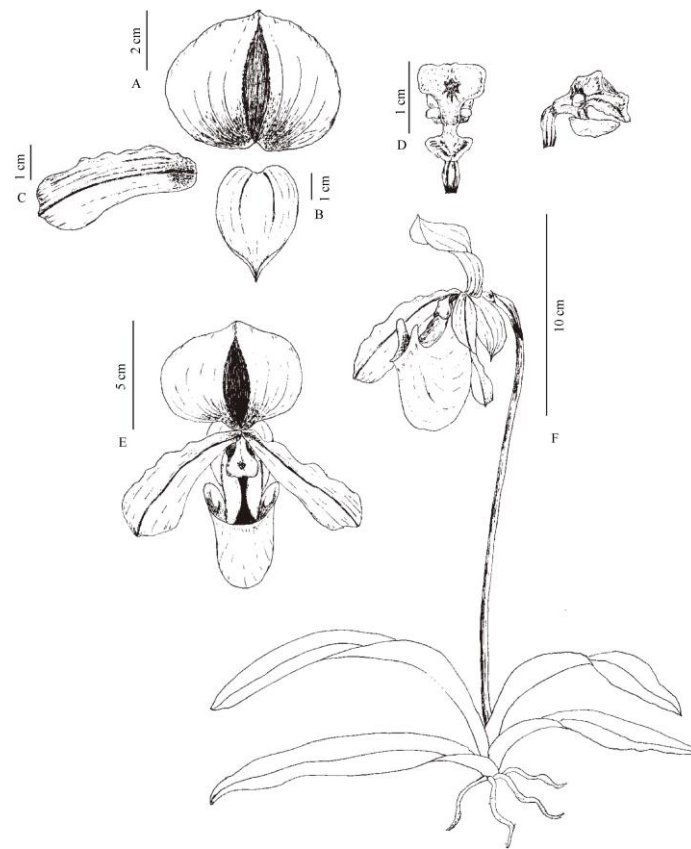


图3 哀牢山兜兰。A: 中萼片; B: 合萼片; C: 花瓣; D: 合蕊柱; E: 花; F: 开花植株。

Fig. 3 *Paphiopedilum x ailaoshanense*. A: Dorsal sepal; B: Synsepal; C: Petal; D: Staminode; E: Flower; F: Flowering plant.

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