

# 木莲属(木兰科)5种植物的花粉形态

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**摘要:** 光学显微镜下观察的木莲属(*Manglietia*) 5种植物的花粉形态相似。长赤道轴大于 45  $\mu\text{m}$ , 属于大的花粉。扫描电镜下观察, 花粉外壁均为小穴状雕纹, 但毛桃木莲(*Manglietia moto*)和厚叶木莲(*M. pachyphylla*)略为粗糙。透射电镜下观察, 5种植物花粉外壁均可分为覆盖层、柱状层和基层。覆盖层不连续, 有小穿孔。在远极面萌发沟区域, 外壁逐渐减薄, 最后覆盖层和柱状层消失, 仅残留基层。柱状层内空间较密实, 内部空隙小, 多由颗粒构成, 处于小柱发育的初级阶段。孢粉学资料证明木莲属是木兰科最原始的类群。

**关键词:** 木莲属; 花粉形态; 木兰科

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**Abstract:** Pollen morphology in five species of *Manglietia* is similar. Pollen grains are large with the longest axis more than 45  $\mu\text{m}$ . Foveolate sculpture is observed on exine surface in all the five species except *Manglietia moto* and *M. pachyphylla* which have slightly coarse exine. The exine of all species can be distinguished by its tectum, baculum and foot-layer. The perforation in tectum is clear. The colpus membrane consists of a thin foot-layer and intine, while the sexine elements (tectum and baculum) are reduced gradually. Spherical granules are frequently observed in baculum with small intraexinous spaces, which is at initial developmental stage. This study supports that genus *Manglietia* is the most primitive group in Magnoliaceae.

**Key words:** *Manglietia*; Pollen morphology; Magnoliaceae

木莲属(*Manglietia*)是木兰科中最原始的类群,也是亚洲东南部的特有属,美洲不产,具有许多原始的特征,如花托伸长、粗壮;雄蕊几乎无花药与花丝的分化,花丝很短,仅 1 mm,扁平,花药内向开裂;心皮多数、离生,腹面具狭纵沟直至花柱末端;导管无螺纹加厚等<sup>[1]</sup>。Canright<sup>[2]</sup>、Agababain<sup>[3]</sup>、Praglowseki<sup>[4]</sup>、龙活<sup>[5]</sup>等先后报道了该属的花粉形态,Praglowseki还报道了红花木莲(*M. insignis*)花粉壁的超微结构。但他们所用的材料全部为干花粉,并经过醋酸酐分解。这种处理在一定程度上会使花粉收缩变形,破坏花粉壁结构。作者曾对木兰科其它属的新鲜花粉形态进行研究,观察到了较完整、

较饱满的花粉粒<sup>[6-8]</sup>。本研究采用新鲜花粉,观察其外壁雕纹和花粉壁的超微结构,为系统研究木兰科花粉形态的演化和木兰科的系统分类提供资料。

### 1 材料和方法

实验材料木莲(*Manglietia fordiana*),大叶木莲(*M. macrophylla*),毛桃木莲(*M. moto*),厚叶木莲(*M. pachyphylla*)和锈毛木莲(*M. rufibarbata*)均采自华南植物园木兰园。取新鲜、成熟花粉,直接封片,在光镜下测量花粉粒的大小。每种花粉均测量 20 粒,取其平均值,并以最大值和最小值示变化幅度。扫描

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5种植物花粉的外壁结构相似,柱状层较密实,内部空隙很小,多为颗粒,少数初生小柱也常与覆盖层和基层倾斜,处于小柱进化中的初级阶段。与已报道的单性木兰属(*Kmeria*)<sup>[6]</sup>、观光木属(*Tsoongiodendron*)<sup>[10]</sup>和鹅掌楸属(*Liriodendron*)<sup>[13]</sup>有发育较好的柱状层相比,木莲属花粉是原始类型的代表。

木莲属花粉形状、外壁雕纹、花粉壁的结构与已报道的木兰科其它属的花粉特征基本一致<sup>[2-4,8,10,13]</sup>,证明 Dandy 所定义的木兰科是一个十分自然的类群<sup>[14]</sup>。木莲属只产于亚洲东南部,不产美洲,全部为常绿大乔木,每心皮胚珠 4-14,从进化的角度看,是该科最原始的类群。本研究也证明了这一点。

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### 图版说明

T: 覆盖层 Tectum; B: 柱状层 Bacula; F: 基层 Foot layer.

#### 图版 I

- 1, 2, 4, 7, 8. 示花粉粒形状。1.大叶木莲; 2.厚叶木莲, 远极面观; 4.锈毛木莲, 近极面观; 7.木莲; 8.毛桃木莲, 赤道面观。1, 2, 8. × 1 000; 4, 7. × 750
- 3, 5, 6, 9, 10. 示花粉外壁雕纹。3.锈毛木莲; 5.厚叶木莲; 6.木莲; 9.毛桃木莲; 10. 大叶木莲。3, 5, 6, 9. × 2 500; 10. × 5 000
- 11.毛桃木莲花粉壁, 示柱状层内颗粒及初生小柱; × 10 000 12.木莲花粉壁. × 15 000

#### 图版 II

- 1, 3, 5. 厚叶木莲。1. 示外壁和内壁, 白箭头示内壁-2 中的球形内含物; × 12 000 3. 黑箭头示覆盖层穿孔; × 15 000 5. 示外壁结构; × 20 000
- 2, 4, 6. 大叶木莲。2. 示外壁和内壁, 白箭头 1, 2, 3 分别示内壁-1, 内壁-2, 内壁-3; × 10 000 4. 示外壁结构; × 30 000 6. 示萌发沟区外壁逐渐变薄; × 30 000
- 7, 8. 锈毛木莲。7. 示外壁结构; × 20 000 8. 示外壁和内壁. × 12 000

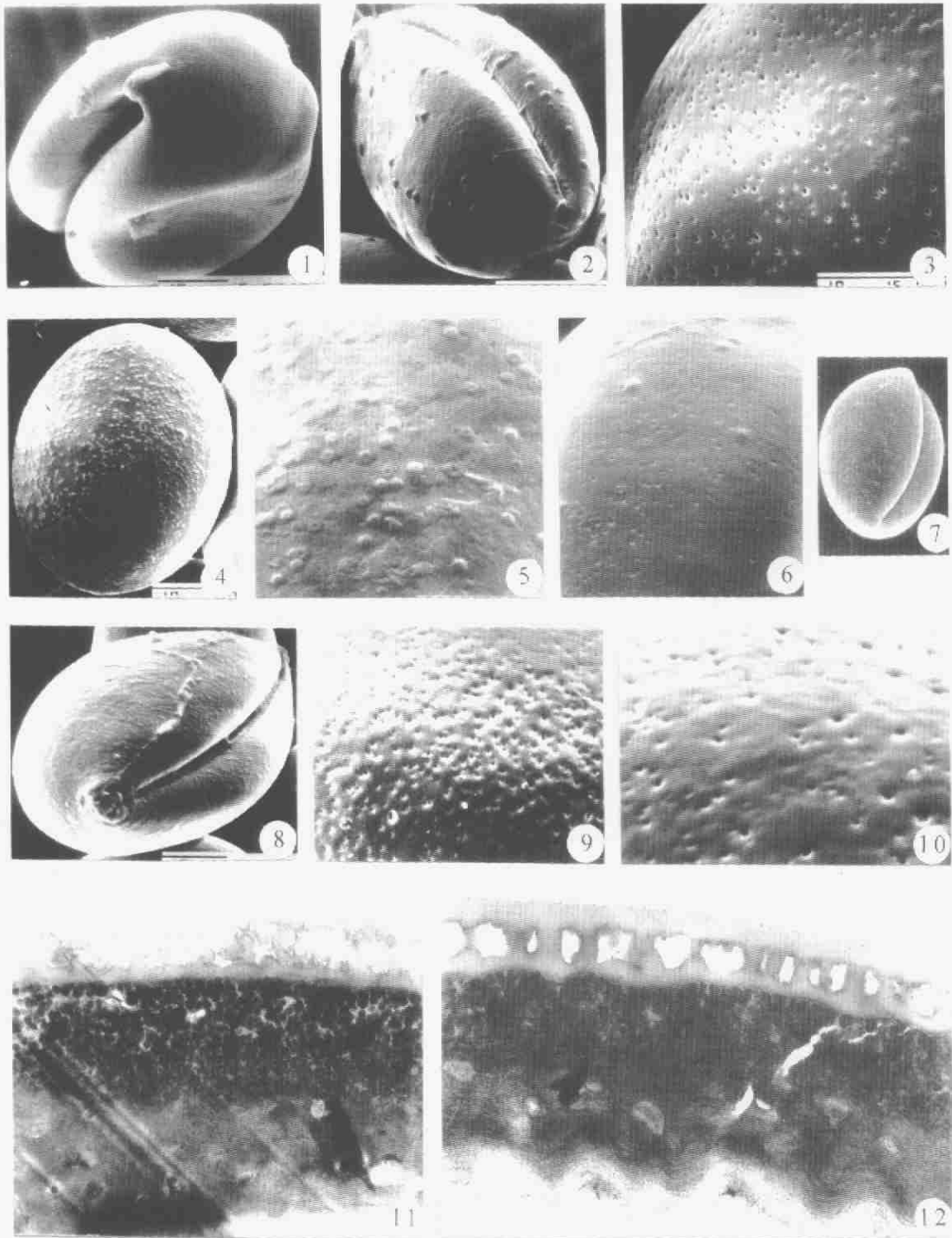
### Explanation of plates

#### Plate I

- 1, 2, 4, 7, 8. Shape of the pollen grain. 1. *M. macrophylla*; 2. *M. pachyphylla*, in distal face; 4. *M. rufibarbata*, in proximal face; 7. *M. fordiana*; 8. *M. moto*, in equatorial face. 1, 2, 8. × 1 000; 4, 7. × 750
- 3, 5, 6, 9, 10. Sculpture under SEM. 3. *M. rufibarbata*; 5. *M. pachyphylla*; 6. *M. fordiana*; 9. *M. moto*; 10. *M. macrophylla*. 3, 5, 6, 9. × 2 500; 10. × 5 000
- 11, 12. Ultrastructure of pollen wall. 11. *M. moto*, showing granula and incipient bacula in baculum; × 10 000 12. *M. fordiana*; × 15 000

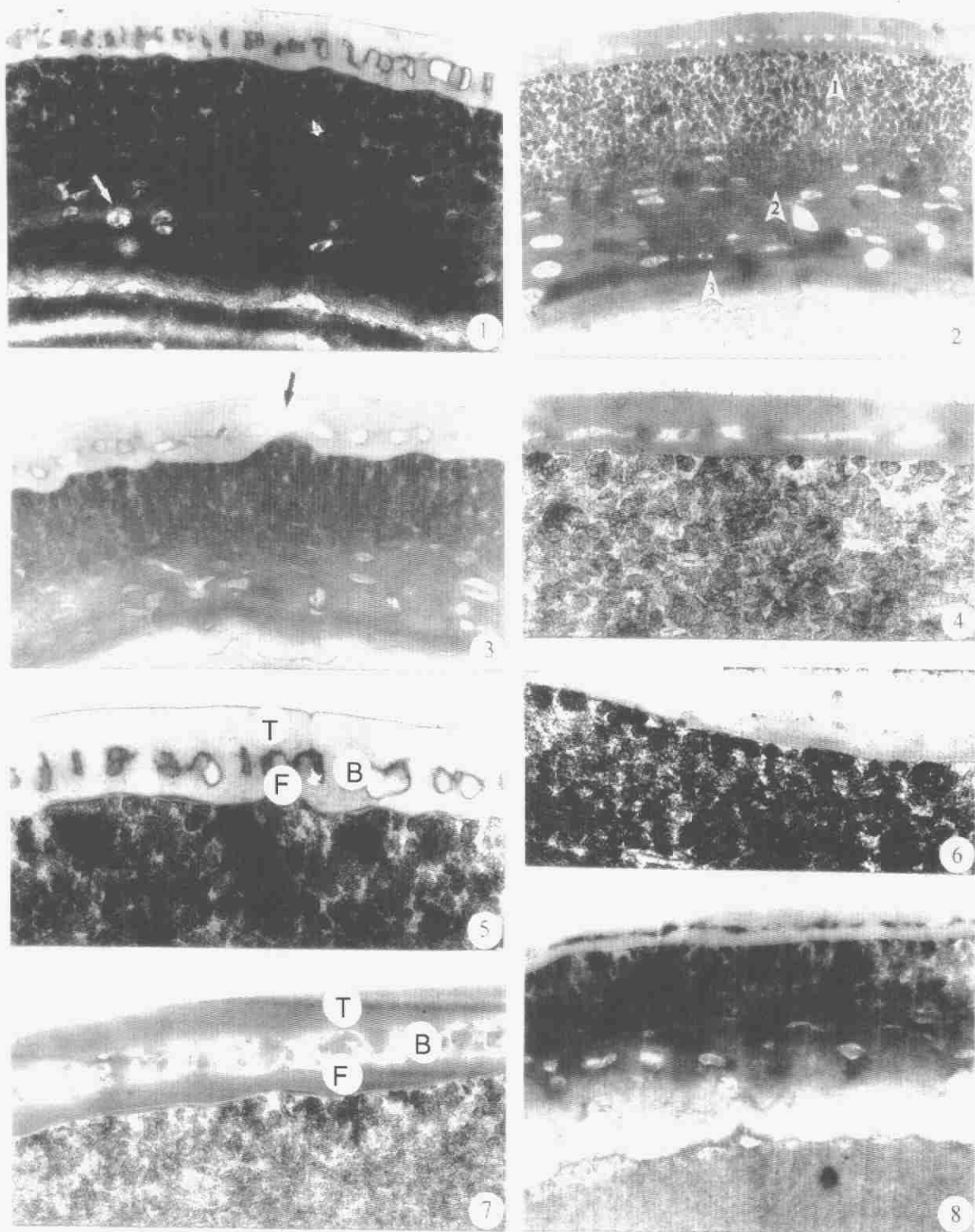
#### Plate II

- 1, 3, 5, *M. pachyphylla*. 1. Exine and intine, white arrow showing spherical inclusions, × 12 000; 3. Tectal perforation (black arrow), × 15 000; 5. Exine; × 20 000
- 2, 4, 6. *M. macrophylla*. 2. Exine and intine, white arrow 1, 2, 3 representing intine-1, intine-2, and intine-3, respectively; × 10 000 4. Exine; × 30 000; 6. Sexine (tectum and baculum) reducing in the foot-layer; × 30 000
- 7, 8. *M. rufibarbata*. 7. Showing the exine; × 20 000; 8. Exine and intine. × 12 000



徐凤霞等: 图版 I

XU Feng-xia et al.: Plate I



徐凤霞等:图版 II

XU Feng-xia et al.: Plate II