

野生厚朴花粉萌发及花粉管生长过程观察

王洁, 杨志玲, 杨旭, 檀国印, 何正松

中国林业科学院亚热带林业研究所

Pollen Germination and Pollen Tube Growth of Wild *Magnolia officinalis* as Observed

WANG Jie, YANG Zhi-Ling, YANG Xu, TAN Guo-Yin, HE Zheng-Song

Research Institute of Subtropical Forestry, Chinese Academy of Forestry

摘要

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摘要 利用荧光显微镜对野生厚朴 (*Magnolia officinalis*) 自然条件下柱头黏附花粉的数量、自花授粉和同株异花授粉时柱头黏附花粉、花粉萌发及花粉管生长过程进行观察。结果显示, 自然传粉条件下只有12%的柱头上可以观察到花粉, 且每个柱头上黏附的花粉量少; 自花授粉后柱头上可以黏附大量花粉, 但花粉不能萌发; 同株异花授粉后柱头上可黏附大量花粉, 花粉可以萌发, 但萌发时间推迟, 且授粉4 h后, 多数花粉管停止伸长, 花粉管伸长过程中出现末端膨大、生长扭曲等现象, 花粉管生长过程中还伴随着一系列胼胝质反应, 在柱头上与花粉管的接触处和乳突细胞表面都可以观察到胼胝质, 胼胝质的产生阻碍了花粉管的正常伸长。因此, 缺乏传粉昆虫和存在受精前障碍是野生厚朴濒危的2个重要原因。

关键词: 厚朴 花粉 柱头 荧光显微镜

Abstract: A fluorescence microscope was used to observe number of pollens adhered on stigmas of wild *Magnolia officinalis* under natural conditions, pollen adhesion to stigmas through self-pollination and geitonogamous pollination, pollen germination and the growth of pollen tubes. It was found that under natural pollination conditions, only 12% of stigmas had some pollen grains adhered, and the number of pollens adhered on each stigma was rather limited; Self-pollination increased the number of pollens adhered on stigmas but the pollens were futile and could not germinate; however, geitonogamous pollination also increased the number of pollens adhered on stigmas and, moreover, the pollens could germinate, but later in time. After pollens got in contact with stigmas, pollen tubes began to grow and 4 hours later, most pollen tubes stopped extending with tips bulging and even twisted. Along with the growth of tubes, a series of callose reactions were observed. Calloses were found at the contacts between the stigmas and pollen tubes and on the surface of stigma papillose cells. They hindered normal extension of pollen tubes. Therefore, the lack of pollination insects and the existence of the pre-fertilization obstacle are the two principal causes leading to endangeredness of the wild *M. officinalis*.

Keywords: *Magnolia officinalis* pollen stigma fluorescence microscope

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Corresponding Authors: 杨志玲 中国林业科学院亚热带林业研究所 Email: zlyang0002@126.com

About author: 王洁 (1986-), 女, 山东淄博人, 硕士生, 主要从事药用植物濒危机制方面的研究。E-mail: wo153215@126.com

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