

研究报告

两种圆柏属植物不同季节显微和超微结构变化与耐寒性的关系

张有福¹, 陈银萍^{2,3}, 张满效^{1,4}, 陈拓¹, 安黎哲^{1,2}

¹中国科学院寒区旱区环境与工程研究所, 兰州 730000; ²兰州大学生命科学学院, 兰州 730000; ³兰州交通大学环境与市政工程学院, 兰州 730070; ⁴兰州石化职业技术学院, 兰州 730060

收稿日期 2005-7-11 修回日期 2006-6-4 网络版发布日期 接受日期

摘要 以祁连圆柏和圆柏为材料,研究了圆柏属植物的抗寒性与解剖结构变化,以及淀粉与可溶性糖粉转化的关系.结果表明,祁连圆柏和圆柏叶片的上下表皮细胞外覆盖一层角质膜,叶肉细胞间隙大,形成发达的通气组织.在生长季节,二者叶绿体内均积累了很多淀粉粒,在冷冻休眠季节淀粉粒消失或变小,同时叶片可溶性糖分含量增加,祁连圆柏的可溶性糖分增幅高于圆柏;而休眠季节圆柏叶绿体受到低温伤害,脂质球数目增多,出现脂质小滴,部分叶绿体变形,祁连圆柏类囊体的结构受到影响较小,脂质球数量少,叶绿体形状没有发生明显的变化.因此,祁连圆柏和圆柏抗寒性与发达的通气组织和淀粉粒生长季节的积累有关,在低温胁迫下祁连圆柏叶绿体表现出高的稳定性,通过可溶性糖分的调节力强,耐寒性增强.

关键词 [圆柏属](#) [显微结构](#) [超微结构](#) [抗寒性](#)

分类号

Seasonal changes in foliar micro-and ultra structure of two *Sabina* species and their relationships with cold tolerance

ZHANG Youfu¹, CHEN Yinping^{2,3}, ZHANG Manxiao^{1,4}, CHEN Tuo¹, AN Lizhe^{1,2}

¹Cold and Arid Region Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou 730000, China; ² School of Life Science, Lanzhou University, Lanzhou 730000, China; ³School of Environmental and Municipal Engineering, Lanzhou Jiaotong University, Lanzhou 730070, China; ⁴Lanzhou College of Petrochemical Technology, Lanzhou 730060, China

Abstract

In this paper, the foliar micro-and ultra structure of *Sabina przewalskii* and *S. chinensis* during growth and dormancy seasons was observed under microscope and transmission electron microscope, and the foliar soluble sugar content was measured, aimed to probe into their relationships with cold tolerance. The results showed that the foliar surface cells of these two *Sabina* species were covered with thick cuticular membrane, and the well developed arenchyma appeared in the mesophyll. In growth season, starch grains accumulated in chloroplasts, but in dormancy season, the accumulated starch grains disappeared or diminished, while soluble sugar content had a larger increase. In wintertime, the chloroplasts of *S. chinensis* were injured, with some abnormal chloroplasts, increased plastoglobuli and some lipid drops, while those of *S. przewalskii* were not obviously injured. It was suggested that the cold tolerance of the two *Sabina* species was related to their well-developed arenchyma, accumulation of starch grains in growth season, and increase of soluble sugar content in dormancy season. *S. przewalskii* had more marked increase of soluble sugar content, and its chloroplasts were more stable than *S. chinensis*.

Key words [Sabina](#) [Microstructure](#) [Ultra structure](#) [Cold tolerance](#)

DOI:

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(1337KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“圆柏属”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [张有福](#)
- [陈银萍](#)
- [张满效](#)
- [陈拓](#)
- [安黎哲](#)

