作物学报 2008, 34(11) 1894-1900 DOI: 10.3724/SP.J.1006.2008.01894 ISSN: 0496-

3490 CN: 11-1809/S

本期目录 | 下期目录 | 过刊浏览 | 高级检索

[打印本页] [关闭]

芝麻核雄性不育系ms86-1小孢子败育过程的超微结构

杨晓丽1:张海洋2,*:郭旺珍1,*:郑永战2:苗红梅2:魏利斌1:张天真1

1南京农业大学作物遗传与种质创新国家重点实验室,江苏南京210095;2河南省农作物新品种重点实验室,河南 郑州450002

摘要:

运用透射电子显微镜对芝麻核雄性不育系ms86-1的可育和不育花药进行了超微结构的比较观察。根据小孢子的细 胞学形态特征,将芝麻花粉发育过程划分为小孢子母细胞形成期、减数分裂期、四分体期、单核小孢子早期、单核 小孢子中期、单核小孢子晚期、花粉成熟期7个时期。对比观察表明芝麻核雄性不育的败育迹象起始于小孢子母细 胞形成期,并伴随着进一步发育,败育现象逐渐明显,小孢子母细胞形成期小孢子母细胞壁形状不规则;减数分裂 ▶加入引用管理器 期小孢子母细胞壁严重扭曲变形,质膜外缺少早期外壁成分——原基粒棒;四分体期胼胝质壁外沉积物异常,呈绒 毛状;四分体解体后形成畸形小孢子,孢子外壁不健全,绒毡层异常肥厚、降解延迟,释放极少量的畸形乌氏体; 随后小孢子愈发皱缩,胞质凝集,内含物减少并逐渐凝聚成一团电子致密物质,最终走向完全败育。本研究揭示了 不育小孢子的败育过程和败育特征,为深入研究芝麻核雄性不育败育机理奠定了基础。

关键词: 芝麻 核雄性不育 小孢子发生 超微结构 透射电子显微镜

Ultrastructure in Microspore Abortion of Genic Male Sterile Line in Sesame (Sesamum indicum L.)

- 1 National Key Laboratory of Crop Genetics and Germplasm Enhancement, Nanjing Agricultural University, Nanjing 210095, Jiangsu; 2 Henan Key Laboratory of Crop Improvement, Zhengzhou 450002, Henan, China
- 1 National Key Laboratory of Crop Genetics and Germplasm Enhancement, Nanjing Agricultural University, Nanjing 210095, Jiangsu; 2 Henan Key Laboratory of Crop Improvement, Zhengzhou 450002, Henan, China

Abstract:

Sesame (*Sesamum indicum* L.) is an important oil-seed crop with great nutritional value, and the sesame 上苗红梅 hybrid has remarkable heterosis in many characters, especially in productivity. To investigate the abortion mechanism of genic male sterile (GMS) line in sesame, a comparative study was conducted on the fertile and sterile microsporogenesis of ms86-1 derived from the male sterile line discovered by Osman using transmission electron microscopy (TEM) techniques. According to the morphologic characteristics of the microspores, the developmental process of sesame pollen could be tentatively divided into seven stages, including microsporocyte formation stage, microsporocyte meiosis stage, tetrad stage, early microspore stage, middle microspore stage, late microspore stage, and pollen maturation stage, respectively. The abnormal phenomena observed in the sterile anthers indicated that male sterility might arise in microsporocyte formation stage. With the growth and development of the sterile anthers, the following abnormal features were observed evidently. The cell wall of the sterile microsporocytes was irregular during their formation stage. In the meiosis stage, the cell walls were getting distorted obviously, and the microsporocytes failed to form the early exine component designated as probaculums on the outside of the plasma membrane. Subsequently, abnormal villiform deposits were observed on the outside of the callose wall during the tetrad stage. As soon as the tetrad cells disintegrated, the released sterile microspores represented aberrantly dumbbell-shaped, and their exines were undergrown without any baculum. Accompanying with the delay of the degeneration process, inclusions of the tapetum cells became more abundant and few abnormal ubisch bodies were secreted. Later on, the sterile microspore was gradually crimpled as its cytoplasm agglomerated to an electron dense clot, and ultimately degraded to the complete abortion. In this paper, compared with the fertile pollen development, the abortion process and characteristics of the sterile anthers were disclosed, providing a foundation for the greater insight into the abortion mechanism of GMS line in sesame.

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1467KB)
- ▶ [HTML全文]
- ▶参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶加入我的书架
- ▶引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶浏览反馈信息

本文关键词相关文章

- ▶芝麻
- ▶核雄性不育
- ▶ 小孢子发生
- ▶超微结构
- ▶透射电子显微镜

本文作者相关文章

- ▶杨晓丽
- ▶ 张海洋
- ▶ 郭旺珍
- ▶ 郑永战
- ▶ 魏利斌
- ▶ 张天真

PubMed

- Article by

Keywords: Sesame (Sesamum indicum L.) Genetic male sterility Microsporogenesis Ultrastructure

收稿日期 2008-04-03 修回日期 1900-01-01 网络版发布日期 2008-09-06

DOI: 10.3724/SP.J.1006.2008.01894

基金项目:

国家重点基础研究发展计划(973计划)前期专项(2003CCA00700).

通讯作者: 张海洋

作者简介:

参考文献:

本刊中的类似文章

- 1. 张鹏; 张海洋; 郭旺珍; 郑永战; 魏利斌; 张天真 . 以SRAP和EST-SSR标记分析芝麻种质资源的遗传多样性[J]. 作物学报, 2007,33(10): 1696-1702
- 2. 武雪萍; 钟秀明; 秦艳青; 刘爽. 芝麻饼肥与化肥不同比例配施对烟叶香气质量的影响[J]. 作物学报, 2006,32(10): 1554-1559
- 3. 高鸿善; 柳家荣; 屠礼传. 核不育芝麻小孢子败育机理的细胞学研究[J]. 作物学报, 1992,18(06): 425-428
- 4. 魏利斌; 张海洋; 郑永战; 郭旺珍; 张天真. 芝麻EST-SSR标记的开发和初步研究[J]. 作物学报, 2008,34(12): 2077-2084
- 5. 车卓, 张艳欣, 孙建, 张秀荣, 尚勋武, 王化俊.应用SRAP标记分析黑芝麻核心种质遗传多样性[J]. 作物学报, 2009,35(10): 1936-1941

文章评论(请注意:本站实行文责自负,请不要发表与学术无关的内容!评论内容不代表本站观点.)

HTTP Status 404 -/zwxb/CN/comment/listCommentInfo.jsp

type Status report

Copyright 2008 by 作物学报