

全国中文核心期刊
中国科技核心期刊
中国农业核心期刊
RCCSE中国核心学术期刊
中国科学引文数据库(CSCD)期刊
CAB International 收录期刊
美国《生物学文摘》收录期刊
美国《化学文摘》(CA)收录期刊

首页 (/) 期刊介绍 编委会 投稿须知 期刊订阅 广告合作 联系我们 返回主站
(/Corp/10.aspx) (/Corp/3600.aspx) (/Corp/5006.aspx) (/Corp/50.aspx) (http://www.haasep.cn/)

«上一篇 (DArticle.aspx? type=view&id=201505011)
下一篇 (DArticle.aspx? type=view&id=201505013)



PDF下载 (pdfdown.aspx? Sid=201505012)

+分享 (http://www.jiathis.com/share? uid=1541069)



微信公众号: 大豆科学

[1] 问涛, 焦学磊, 刘晓英, 等. 光谱分布对大豆子叶节再生的影响[J]. 大豆科学, 2015, 34(05): 826-832. [doi:10.11861/j.issn.1000-9841.2015.05.0826]
WEN Tao, JIAO Xue-lei, LIU Xiao-ying, et al. Effects of Light Spectra on Soybean Cotyledonary Node Regeneration System[J]. Soybean Science, 2015, 34(05): 826-832. [doi:10.11861/j.issn.1000-9841.2015.05.0826]

点击复制

光谱分布对大豆子叶节再生的影响

《大豆科学》 [ISSN:1000-9841 /CN:23-1227/S] 卷: 第34卷 期数: 2015年05期 页码: 826-832 栏目: 出版日期: 2015-10-25

Title: Effects of Light Spectra on Soybean Cotyledonary Node Regeneration System

作者: 问涛 (KeySearch.aspx?type=Name&Sel=问涛); 焦学磊 (KeySearch.aspx?type=Name&Sel=焦学磊); 刘晓英 (KeySearch.aspx?type=Name&Sel=刘晓英); 徐志刚 (KeySearch.aspx?type=Name&Sel=徐志刚)
南京农业大学 农学院, 江苏 南京 210095

Author(s): WEN Tao (KeySearch.aspx?type=Name&Sel=WEN Tao); JIAO Xue-lei (KeySearch.aspx?type=Name&Sel=JIAO Xue-lei); LIU Xiao-ying (KeySearch.aspx?type=Name&Sel=LIU Xiao-ying); XU Zhing-gang (KeySearch.aspx?type=Name&Sel=XU Zhing-gang)

College of Agronomy, Nanjing Agricultural University, Nanjing 210095, China

关键词: 大豆 (KeySearch.aspx?type=Keyword&Sel=大豆); 光谱分布 (KeySearch.aspx?type=Keyword&Sel=光谱分布); 子叶节 (KeySearch.aspx?type=Keyword&Sel=子叶节); 丛生芽 (KeySearch.aspx?type=Keyword&Sel=丛生芽); LED (KeySearch.aspx?type=Keyword&Sel=LED)

Keywords: Soybean (KeySearch.aspx?type=Keyword&Sel=Soybean); Light spectra (KeySearch.aspx?type=Keyword&Sel=Light spectra); Cotyledonary node (KeySearch.aspx?type=Keyword&Sel=Cotyledonary node); Multiple shoot (KeySearch.aspx?type=Keyword&Sel=Multiple shoot); LED light (KeySearch.aspx?type=Keyword&Sel=LED light)

DOI: 10.11861/j.issn.1000-9841.2015.05.0826 (http://dx.doi.org/10.11861/j.issn.1000-9841.2015.05.0826)

文献标志码: A

摘要: 以辽鲜1号大豆品种为试材, 研究了不同光谱分布对大豆子叶节再生的影响, 为菜用大豆子叶节遗传转化受体体系的改进提供借鉴。以萌发7 d的子叶节为外植体, 依次接种于丛生芽诱导培养基、伸长培养基和生根培养基中, 并且分别置于6种LED组合光源中培育, 以荧光灯作为对照。光密度设置为 $50 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$, 光周期设置为 $12 \text{ h}\cdot\text{d}^{-1}$ 。结果表明: 复合光谱中630 nm红光会抑制丛生芽之间相互伸长, 而660 nm红光能显著缓解相互抑制作用, 并且更有利于丛生芽形态生长、叶绿素合成和干物质积累以及生根苗形态生长、干物质积累和根系发育。添加绿光或黄光均抑制丛生芽相互之间的伸长, 且添加黄光抑制更强, 添加绿光可促进丛生芽的叶绿素合成、干物质积累及生根壮苗。

Abstract: The soybean cultivar Liaoxian 1 was used as the experimental material to determine the effects of different light spectra on soybean cotyledonary node regeneration. Under six different light conditions, the soybean cotyledonary nodes from germinated seeds for 7 d were used as the explant and inoculated onto shoot initiation, shoot elongation and rooting medium successively. The photosynthetic photon flux density (PPFD) was $50 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$, and photoperiod was 12 h light/12 h dark. The results showed that the 630 nm red light resulted in inhibition of elongation between multiple shoots. Compared with 630 nm red light, 660 nm red light promoted remission of this inhibition noticeably, and resulted in greater growth, chlorophyll accumulation and dry mass of multiple shoots, and greater growth, dry mass and root development of regenerated plantlet. Green or yellow light added to the complex spectra of red and blue light resulted in inhibition of elongation between multiple shoots, yellow light aggravated this inhibition. Green light added to the complex spectra of red and blue light resulted in greater growth, chlorophyll accumulation and dry mass of multiple shoots, and rooting of soybean plantlet in vitro

参考文献/References:

- [1] 李桂兰, 乔亚科, 杨少辉, 等. 农杆菌介导大豆子叶节遗传转化的研究 [J]. 作物学报, 2005, 31(2):170-176. (Li G L, Qiao Y K, Yang S H, et al. Study of the Agrobacterium-mediated transformation systems of soybean cotyledonary node [J]. Acta Agronomica Sinica, 2005, 31(2):170-176)
- [2] 孙昕, 闫帆, 赵健如, 等. 大豆子叶节丛生芽的诱导研究 [J]. 大豆科学, 2012, 31(2): 184-187 (Sun X, Yan F, Zhao J R, et al. Induction of multiple shoots from soybean cotyledonary node [J]. Soybean Science, 2012, 31(2): 184-187)
- [3] 郝荣华, 邵群, 杨素欣, 等. 根癌农杆菌介导的大豆子叶节转化体系的优化 [J]. 大豆科学, 2012, 13(2): 167-172. (Hao R H, Shao Q, Yang S X, et al. Optimization of Agrobacterium-mediated soybean transformation using the cotyledonary node [J]. Soybean Science, 2012, 13(2): 167-172)
- [4] Collado R, Veitia N, Bermúdez-Carballoso I, et al. Efficient in vitro plant regeneration via-indirect organogenesis for different common bean cultivars [J]. Scientia Horticulturae, 2013, 153: 109-116
- [5] Cheng T Y, Saka H, Voqiu-Dinh T H. Plant regeneration from soybean cotyledonary node segments in culture [J]. Plant Science Letters, 1980, 19(2): 91-99
- [6] Veltcheva M, Svetleva D, Petkova S P, et al. In vitro regeneration and genetic transformation of common bean (Phaseolus vulgaris L)-Problems and progress [J]. Scientia Horticulturae, 2005, 107 (1): 2-10
- [7] 刘博林, 徐新民. 两个栽培大豆品种的体细胞胚胎发生和植株再生研究 [J]. 中国油料作物学报, 1999, 21(2): 11-13. (Liu B L, Xu X M. Study on somatic embryogenesis and plant regeneration of two commercial soybean cultivars [J]. Chinese Journal of Oil Crop Science, 1999, 21(2): 11-13)

- [8] Meurer C A, Dinkins R D, Collins G B. Factors affecting soybean cotyledonary node transformation [J]. *Plant Cell Reports*.1998, 18: 180-186
- [9] 李明春, 蔡易, 赵桂兰, 等. 改良大豆子叶节再生体系的研究 [J]. *作物学报*, 2006, 32(2): 223-227. (Li M C, Cai Y, Zhao G L, et al. Improvement of cotyledon node regeneration system in soybean (*Glycine max*) [J]. *Acta Agronomica Sinica*, 2006, 32(2): 223-227)
- [10] Sairam R V, Franklin G, Hassel R, et al. A study on the effect of genotypes, plant growth regulators and sugars in promoting plant regeneration via organogenesis from soybean cotyledonary nodal callus [J]. *Plant Cell, Tissue and Organ Culture*, 2003, 75: 79-85
- [11] 聂王星, 於丙军. TDZ和6-BA对大豆子叶节再生体系中丛生芽诱导的效应 [J]. *南京农业大学学报*, 2012, 35(4): 130-134. (Nie W X, Yu B J. Effects of TDZ and 6-BA on inducing multiple shoots in soybean cotyledonary node regeneration system [J]. *Journal of Nanjing Agricultural University*, 2012, 35(4): 130-134)
- [12] 张晓娟, 方小平, 罗丽霞, 等. TDZ和BA对诱导大豆胚轴植株再生的影响 [J]. *中国油料作物学报*, 2000, 22(1): 24-26. (Zhang X J, Fang X P, Luo L X, et al. Influence of TDZ and BA on efficiency of plant regeneration via organogenesis in soybean [J]. *Chinese Journal of Oil Crop Science*, 2000, 22(1): 24-26.)
- [13] Poudel P R, Kataoka I, Mochioka R. Effect of red-and blue-light emitting diodes on growth and morphogenesis of grapes [J]. *Plant Cell*, 2008, 92 (2): 147-153
- [14] 徐玲玲, 丁朵朵, 陶贵荣, 等. 不同光照强度和光质对铁线莲品种繁星 (*Clematis 'nelly moser'*) 不定芽诱导和生长的影响 [J]. *光子学报*, 2013, 42(6): 715-720. (Xu L L, Ding D D, Tao G R, et al. Effects of different light intensity and light quality on adventitious buds induction and growth of *Clematis 'nelly moser'* [J]. *Acta Photonica Sinica*, 2013, 42 (6): 715-720.)
- [15] Liu M X, Xu Z G, Yang Y, et al. Effects of different spectral lights on *Oncidium* PLBs induction, proliferation, and plant regeneration [J]. *Plant Cell, Tissue and Organ Culture*, 2011, 106 (1): 1-10
- [16] 马琳, 刘世琦, 张自坤, 等. 光质对大蒜愈伤组织诱导、增殖及器官分化的影响 [J]. *西北农业学报*, 2011, 20(6): 118-122. (Ma L, Liu S Q, Zhang Z K, et al. Effect of different light qualities on callus induction, multiplication and organ differentiation of garlic [J]. *Acta Agriculturae Boreali-occidentalis Sinica*, 2011, 20(6): 118-122.)
- [17] Lin Y, Li J, Li B, et al. Effects of light quality on growth and development of protocorm-like bodies of *Dendrobium officinale* in vitro [J]. *Plant Cell, Tissue and Organ Culture*, 2011, 105 (3): 329-335
- [18] 蒋向辉, 余朝文, 李丹, 等. 野生大豆丛生芽诱导及快速繁殖 [J]. *大豆科学*, 2008, 27(4): 697-700. (Jiang X H, She C W, Li D, et al. Caespitose shoots induction and rapid propagation of *G. soja* [J]. *Soybean Science*, 2008, 27(4): 697-700.)
- [19] Burritt D J, Leung D W M. Adventitious shoot regeneration from *Begonia erythrophylla* petiole sections is developmentally sensitive to light quality [J]. *Physiology Plant*, 2003, 118: 289-296
- [20] Hunter D C, Burritt D J. Light quality influences adventitious shoot production from cotyledon explants of lettuce (*Lactuca sativa* L) [J]. *In vitro Cellular Developmental Biology Plant*, 2004, 40: 215-220
- [21] 倪德祥, 张丕方, 陈刚, 等. 光质对康乃馨试管苗生长发育的影响 [J]. *园艺学报*, 1985, 12(3): 197-202. (Ni D Y, Zhang P F, Chen G, et al. The effect of light quality on growth and development of the test-tube seedlings of *Dianthus Caryophyllus* L [J]. *Acta Horticulturae Sinica*, 1985, 12(3): 197-202.)
- [22] 邱承祥, 武天龙. 6-BA对大豆茎尖诱导再生植株的研究 [J]. *大豆科学*, 2003, 22(1): 32-35. (Qiu C X, Wu T L. Study on 6-BA to the regeneration of tip shoot of soybean [J]. *Soybean Science*, 2003, 22(1): 32-35.)
- [23] 刘晓英, 徐志刚, 常涛涛, 等. 不同光质LED弱光对樱桃番茄植株形态和光合性能的影响 [J]. *西北植物学报*, 2010, 30(4): 645-651. (Liu X Y, Xu Z G, Chang T T, et al. Growth and photosynthesis of cherry tomato seedling exposed to different low light of LED light quality [J]. *Acta Botanica Boreali-Occidentalia Sinica*, 2010, 30 (4): 645-651.)
- [24] 张欢, 徐志刚, 崔瑾, 等. 不同光谱能量分布对菊花试管苗增殖及生根的影响 [J]. *园艺学报*, 2010, 37(10): 1629-1636 (Zhang H, Xu Z G, Cui J, et al. Effects of light spectral energy distribution on multiplication and rooting of *Chrysanthemum* plantlets in vitro [J]. *Acta Horticulturae Sinica*, 2010, 37(10): 1629-1636)
- [25] Kim S J, Hahn E J, Heo J W, et al. Effects of LEDs on net photosynthetic rate, growth and leaf stomata of *Chrysanthemum* plantlets in vitro [J]. *Scientia Horticulturae*, 2004, 101: 143-151
- [26] Kim H H, Goins G H, Wheeler R M, et al. Green-light supplementation for enhanced lettuce growth under red-and blue-light-emitting diodes [J]. *Hort Science*, 2004, 39 (7): 1617-1622
- [27] Yue S Y, Wada K, Futsuhara Y. Comparative studies of organogenesis and plant regeneration in various soybean explants [J]. *Plant Science*, 1990, 72(1): 101-108.
- [28] 袁鹰, 刘德璞, 郑培和, 等. 大豆组织培养再生植株研究 [J]. *大豆科学*, 2001, 20(1): 9-14. (Yuan Y, Liu D P, Zheng P H, et al. Study on plant regeneration from soybean culture [J]. *Soybean Science*, 2001, 20(1): 9-14.)
- [29] Afreen-Zobayed F, Zobayed S M A, Kubota C, et al. Supporting material affects the growth and development of in vitro sweet potato plantlets cultured photoautotrophically [J]. *In vitro Cellular Developmental Biology Plant*, 1999, 35(6): 470-474
- [30] Normanly Auxin metabolism [J]. *Physiologia Plantarum*, 1997, 100: 431-442.
- [31] Kutschera U, Briggs W R. Root phototropism: from dogma to the mechanism of blue light perception [J]. *Planta*, 2012, 235: 443-452
- [32] Nhut D T, Takamura T, Watanabe H, et al. Responses of strawberry plantlets cultured in vitro under superbright red and blue light-emitting diodes (LEDs). *Plant Cell, Tissue and Organ Culture*, 2003, 73: 43-52.
- [33] Olle M, Vir-ile A. The effects of light emitting diode lighting on greenhouse plant growth and quality [J]. *Agricultural and Food Science*, 2013, 22, 223-224
- [34] Liu X Y, Guo S R, Chang T T, et al. Regulation of the growth and photosynthesis of cherry tomato seedlings by different light irradiations of light emitting diodes (LED) [J]. *African Journal of Biotechnology*, 2012, 22(11): 6169-6177.
- [35] Johkan M, Shoji K, Goto K, et al. Effect of green light wavelength and intensity on photomorphogenesis and photosynthesis in *Lactuca sativa* [J]. *Environmental and Experimental Botany*, 2012, 75: 128-133
- [36] Li H M, Xu Z G, Tang C M. Effect of light-emitting diodes on growth and morphogenesis of upland cotton (*Gossypium hirsutum* L) plantlets in vitro [J]. *Plant Cell, Tissue and Organ Culture*, 2010, 103: 155-163
- [37] Lian M L, Murthy H N, Paek K Y. Effects of light emitting diodes on the in vitro induction and growth of bulblets of *Lilium* oriental hybrid 'Pesaro' [J]. *Scientia Horticulturae*, 2002, 94: 365-370.

相似文献/References:

[1] 刘章雄, 李卫东, 孙石, 等. 1983~2010年北京大豆育成品种的亲本地理来源及其遗传贡献 [J]. (article.aspx?type=view&id=201301001) *大豆科学*, 2013, 32(01): 1. [doi:10.3969/j.issn.1000-9841.2013.01.002]

LIU Zhang-xiong, LI Wei-dong, SUN Shi, et al. Geographical Sources of Germplasm and Their Nuclear Contribution to Soybean Cultivars Released during 1983 to 2010 in Beijing [J]. *Soybean Science*, 2013, 32(05): 1. [doi:10.3969/j.issn.1000-9841.2013.01.002]

[2] 李彩云, 余永亮, 杨红旗, 等. 大豆脂质转运蛋白基因GmLTP3的特征分析 [J]. (article.aspx?type=view&id=201301002) *大豆科学*, 2013, 32(01): 8. [doi:10.3969/j.issn.1000-9841.2013.01.003]

LI Cai-yun, YU Yong-liang, YANG Hong-qi, et al. Characteristics of a Lipid-transfer Protein Gene GmLTP3 in *Glycine max* [J]. *Soybean Science*, 2013, 32(05): 8. [doi:10.3969/j.issn.1000-9841.2013.01.003]

[3] 王明霞, 崔晓霞, 薛晨晨, 等. 大豆耐盐基因GmHAL3a的克隆及RNAi载体的构建 [J]. (article.aspx?type=view&id=201301003) *大豆科学*, 2013, 32(01): 12. [doi:10.3969/j.issn.1000-9841.2013.01.004]

WANG Ming-xia, CUI Xiao-xia, XUE Chen-chen, et al. Cloning of Halotolerance 3 Gene and Construction of Its RNAi

- Vector in Soybean (*Glycine max*) [J]. *Soybean Science*, 2013, 32(05):12. [doi:10.3969/j.issn.1000-9841.2013.01.004]
- [4] 张春宝, 李玉秋, 彭宝, 等. 线粒体ISSR与SCAR标记鉴定大豆细胞质雄性不育系与保持系[J]. (article.aspx?type=view&id=201301005) *大豆科学*, 2013, 32(01):19. [doi:10.3969/j.issn.1000-9841.2013.01.005]
- ZHANG Chun-bao, LI Yu-qiu, PENG Bao, et al. Identification of Soybean Cytoplasmic Male Sterile Line and Maintainer Line with Mitochondrial ISSR and SCAR Markers[J]. *Soybean Science*, 2013, 32(05):19. [doi:10.3969/j.issn.1000-9841.2013.01.005]
- [5] 卢清瑶, 赵琳, 李冬梅, 等. RAV基因对拟南芥和大豆不定芽再生的影响[J]. (article.aspx?type=view&id=201301006) *大豆科学*, 2013, 32(01):23. [doi:10.3969/j.issn.1000-9841.2013.01.006]
- LU Qing-yao, ZHAO Lin, LI Dong-mei, et al. Effects of RAV gene on Shoot Regeneration of *Arabidopsis* and Soybean [J]. *Soybean Science*, 2013, 32(05):23. [doi:10.3969/j.issn.1000-9841.2013.01.006]
- [6] 杜景红, 刘丽君. 大豆fad3c基因沉默载体的构建[J]. (article.aspx?type=view&id=201301007) *大豆科学*, 2013, 32(01):28. [doi:10.3969/j.issn.1000-9841.2013.01.007]
- DU Jing-hong, LIU Li-jun. Construction of fad3c Gene Silencing Vector in Soybean[J]. *Soybean Science*, 2013, 32(05):28. [doi:10.3969/j.issn.1000-9841.2013.01.007]
- [7] 张力伟, 樊颖伦, 牛腾飞, 等. 大豆“冀黄13”突变体筛选及突变体库的建立[J]. (article.aspx?type=view&id=201301008) *大豆科学*, 2013, 32(01):33. [doi:10.3969/j.issn.1000-9841.2013.01.008]
- ZHANG Li-wei, FAN Ying-lun, NIU Teng-fei, et al. Screening of Mutants and Construction of Mutant Population for Soybean Cultivar “Jihuang13” [J]. *Soybean Science*, 2013, 32(05):33. [doi:10.3969/j.issn.1000-9841.2013.01.008]
- [8] 盖江南, 张彬彬, 吴瑶, 等. 大豆不定胚悬浮培养基因型筛选及基因枪遗传转化的研究[J]. (article.aspx?type=view&id=201301009) *大豆科学*, 2013, 32(01):38. [doi:10.3969/j.issn.1000-9841.2013.01.009]
- GAI Jiang-nan, ZHANG Bin-bin, WU Yao, et al. Screening of Soybean Genotypes Suitable for Suspension Culture with Adventitious Embryos and Genetic Transformation by Particle Bombardment[J]. *Soybean Science*, 2013, 32(05):38. [doi:10.3969/j.issn.1000-9841.2013.01.009]
- [9] 王鹏飞, 刘丽君, 唐晓飞, 等. 适于体细胞胚发生的大豆基因型筛选[J]. (article.aspx?type=view&id=201301010) *大豆科学*, 2013, 32(01):43. [doi:10.3969/j.issn.1000-9841.2013.01.010]
- WANG Peng-fei, LIU Li-jun, TANG Xiao-fei, et al. Screening of Soybean Genotypes Suitable for Somatic Embryogenesis [J]. *Soybean Science*, 2013, 32(05):43. [doi:10.3969/j.issn.1000-9841.2013.01.010]
- [10] 刘德兴, 年海, 杨存义, 等. 耐酸铝大豆品种资源的筛选与鉴定[J]. (article.aspx?type=view&id=201301011) *大豆科学*, 2013, 32(01):46. [doi:10.3969/j.issn.1000-9841.2013.01.011]
- LIU De-xing, NIAN Hai, YANG Cun-yi, et al. Screening and Identifying Soybean Germplasm Tolerant to Acid Aluminum [J]. *Soybean Science*, 2013, 32(05):46. [doi:10.3969/j.issn.1000-9841.2013.01.011]

备注/Memo 基金项目: 农业部公益行业(农业)科研专项(201303108); 国家高技术研究发展计划“863计划”(2013AA103003)。
第一作者简介: 闻涛(1990-), 女, 硕士, 主要从事植物光生物学研究。E-mail: 2012101056@njau.edu.cn。通讯作者: 徐志刚(1967-), 男, 教授, 主要从事植物光生物学与设施光环境的研究。E-mail: xuzhigang@njau.edu.cn。

更新日期/Last Update: 2015-11-07