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作者: 刘众悦[1] (KeySearch.aspx?type=Name&Sel=刘众悦)；王红玲[1] (KeySearch.aspx?type=Name&Sel=王红玲)[2] (KeySearch.aspx?type=Name&Sel=2</sup>)) (KeySearch.aspx?type=Name&Sel=2</sup>)；刘春[1] (KeySearch.aspx?type=Name&Sel=刘春)[3] (KeySearch.aspx?type=Name&Sel=3</sup>)) (KeySearch.aspx?type=Name&Sel=3</sup>)；麻浩[1] (KeySearch.aspx?type=Name&Sel=麻浩)
1南京农业大学作物遗传与种质创新国家重点实验室，南京农业大学大豆所，江苏 南京 210095；
2江苏省林业科学院遗传育种研究所，江苏 南京 211153；
3衡阳师范学院生命科学系，湖南 衡阳 421008

Author(s): LIU Zhong-yue[1] (KeySearch.aspx?type=Name&Sel=LIU Zhong-yue)；WANG Hong-ling[1] (KeySearch.aspx?type=Name&Sel=WANG Hong-ling)[2] (KeySearch.aspx?type=Name&Sel=2</sup>) (KeySearch.aspx?type=Name&Sel=2</sup>)；LIU Chun[1] (KeySearch.aspx?type=Name&Sel=LIU Chun)[3] (KeySearch.aspx?type=Name&Sel=3</sup>) (KeySearch.aspx?type=Name&Sel=3</sup>)；MA Hao[1] (KeySearch.aspx?type=Name&Sel=MA Hao)
1State Key Laboratory of Crop Genetics and Germplasm Enhancement, Soybean Research Institue, Nanjing Agricultural University, Nanjing 210095, Jiangsu;
2Institute of Genetics and Breeding, Forest Academy of Jiangsu Province, Nanjing 211153, Jiangsu;
3Department of Life Science, Hengyang Normal University, Hengyang 421008, Hunan, China

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摘要: 我国大豆种质资源中存在着丰富的主要贮藏蛋白亚基变异类型，它们是大豆品质改良和育种重要的种质基础，因而研究其变异发生的机制有着积极的指导作用。以7个$A_5A_4B_3$亚基缺失体、2个A_3B_4亚基缺失体和正常品种为材料，在采用SDS-PAGE验证亚基缺失表现稳定的前提下，克隆得到缺失亚基所对应的基因序列和cDNA序列，然后通过与NCBI上已公布的正常序列进行比较，发现7个材料编码$A_5A_4B_3$亚基的DNA序列和cDNA序列的起始密码子都由ATG突变成了ATA，形成一个严重错误的翻译阅读框，引起缺失；2个材料编码A_3B_4亚基的DNA序列并无明显差异，但cDNA序列的终止密码子都由TAA突变成了CAA，可能会导致翻译出来的亚基前体额外多出17个氨基酸的尾巴，引起缺失。

Abstract: There is great genetic diversity in the relative content of seed storage protein subunits in Chinese soybean germplasm, which is the foundation of soybean protein quality improvement. Therefore, it will be helpful for soybean high-quality protein breeding to understand the molecular mechanism of the subunit mutations. Based on the validation of their subunit deficiency by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE), seven landraces without $A_5A_4B_3$and two without A_3B_4subunit were used as experimental materials and their subunit mutant gene sequences and cDNA sequences were obtained. Compared with normal sequences on NCBI, the start codon ATG of the genes and cDNAs encoding the $A_5A_4B_3$subunits of seven mutant landraces was found to mutate to ATA, which produced a fire-new reading frame of translation and resulted in subunit lacking. While the stop codon TAA of cDNAs encoding A_3B_4subunit of two mutant landraces were found to mutate to CAA, which may resulted in an additional tail in pro-glycinin and caused subunit lacking.

参考文献/References:
[1]Nielsen N C, Dickinson C D, Cho T J, et al.Charactrization of the glycinin gene family in soybean[J].The Plant Cell, 1989, 1(3):313-328.
[2]Sims T L, Goldberg R B.The glycinin Gy1 gene from soybean[J].Nucleic Acids Research, 1989, 17(11):43-86.

[3]Thanh V H，Tumer N E，Nielsen N C.The glycinin Gy2 gene from soybean[J].Nucleic Acids Research，1989，17(11):43-87.
[4]Cho T J，Davies C S，Nielsen N C.Inheritance and organization of glycinin genes in soybean[J].The Plant Cell，1989，1(3):329-337.
[5]刘春，王显生，麻浩.大豆种子贮藏蛋白遗传改良研究进展[J].大豆科学，2008，27(5):866-873.(Liu C，Wang X S，Mao H.Genetic improvement on soybean seed storage proteins[J].Soybean Science，2008，27(5):866-873.)
[6]Kaizuma N.A mutant line on 11S globulin subunits induced with gamma-ray irradiation[J].Japanese Journal of Breeding,1990，40[Suppl.1]：505-506.
[7]Yagasaki K，Kaizuma N，Kitamura K.Inheritance of glycinin subunits and characterization of glycinin molecules lacking the subunits in soybean[Glycine max(L.）Merr.][J].Breeding Science，1996，46(1)：11-15.
[8]Takahashi M，Uematsu Y，Kashiwaba K，et al.Accumulation of high levels of free amino acids in soybean seeds through integration of mutation conferring seed protein deficiency[J].Planta，2003，217(4):577-586.
[9] Kitamura K，Ishimoto M，Kaizuma N.Genetic relationships among genes for the subunits of soybean 11S globulin [J].Japanese Journal of Breeding，1993，43[Suppl.2]:159-163.
[10]Scallon B J，Dickinson C D，Nielsen N C.Characterization of a null- allele for the Gy4 glycinin gene from soybean[J].Molecular and General Genetics，1987，208(1-2):107-113.
[11]麻浩，王显生，刘春，等.706份中国大豆种质贮藏蛋白7S和11S组分及其亚基相对含量的研究[J].大豆科学，2006，25(1):11-17.(Mao H，Wang X S，Liu C，et al.The content variation of 7S，11S globulins and their subunits of seed storage protein of 706 Chinese soybean germplasm[J].Soybean Science，2006，25(1):11-17.)
[12]王显生，麻浩，向世鹏，等.不同SDSPAGE分离胶浓度条件下大豆贮藏蛋白亚基的分辨效果[J].中国油料作物学报，2004，26(2):75-80.(Wang X S，Mao H，Xiang S P，et al.The resolving effect of soybean storage protein subunits under different separation gel concentrations of SDS-PAGE[J].Chinese Journal of Oil Crop Sciences，2004，26(2):75-80.)
[13]王关林，方宏筠.植物基因工程原理与技术[M].北京：科学出版社，2002，742-744.(Wang G L，Fang H J.The principle and technology of plant engineering[M].Beijing：Science Press，2002：742-744.)
[14]Beilinson V，Chen Z，Shoemaker R C，et al.Genomic organization of glycinin genes in soybean[J].Theoretical and Applied Genetics，2002，104(6-7):1132-1140.
[15]郭顺堂，孟岩，邱丽娟，等.中国大豆蛋白亚基构成分析与缺失部分亚基的特异大豆品种的筛选[J].作物学报，2006，32(8):1130-1134.(Guo S T，Meng Y，Qiu L J，et al.Analysis of protein subunit composition of Chinese soybean[Glycine max(L.）Merr.] cultivars and screening of soybean cultivars lacking some subunits[J].Crop Science，2006，32(8):1130-1134.)

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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):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]. (darticle.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(03):46.[doi:10.3969/j.issn.1000-9841.2013.01.011]

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作者简介：刘众悦(1985-)，男，硕士研究生，现主要从事大豆品质改良与利用研究。王红玲为共同第一作者。
通讯作者：麻浩，教授，博士生导师。E-mail：Lq-ncsi@njau.edu.cn。

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