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东北野生大豆遗传多样性分析

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摘要: 对东北三省15个小区3 069份大豆种质资源的11个主要性状进行遗传多样性分析。结果表明: 黑龙江省野生大豆资源的多样性指数在0.580~0.952; 吉林省野生大豆资源的多样性指数在0.757~0.865; 辽宁省野生大豆资源的多样性指数在0.666~0.922。多样性最丰富的地区集中在黑龙江南部、中部及辽宁辽中地区; 而黑龙江极早熟地区的多样性较贫乏。研究表明松嫩平原东北部、三江平原及辽河平原北部为东北野生大豆遗传多样性富集区。15个小区11个主要性状的多样性均以蛋白含量的多样性指数最大, 脐色和花色的多样性指数最小。东北三省野生大豆资源综合变异系数辽宁最高 (35.03)、吉林次之 (33.31)、黑龙江略低 (30.23)。

Abstract: Based on 15 ecological regions from Northeast China, genetic diversities of 3 069 wild soybean accessions were analyzed using 11 main phenotypic characters. The result showed that: The wild soybean diversity index of Heilongjiang varied from 0.580 to 0.952; diversity index of Jilin varieties varied from 0.757 to 0.865; diversity index in Liaoning varied from 0.666 to 0.922. The greatest diversity was found in the South and Middle Heilongjiang, and in the Middle of Liaoning; the lowest diversity was found in the region of Heilongjiang where suitable for the very early maturity soybean. According to the results, Northeast of Songnen plain, Sanjiang plain and North Liaohe plain are the enrichment region for wild soybean diversity. Extensive genetic diversity was found for protein content, and a little diversity was found for hilum color and flower color. The coefficient of variation of Liaoning, Jilin and Heilongjiang is 35.03, 33.31 and 30.23 respectively.

参考文献/References:

[1] 董英山, 庄炳昌, 赵丽梅, 等. 中国野生大豆遗传多样性中心 [J]. 作物学报, 2000, 26(5): 521-527 (Dong Y S, Zhuang B C, Zhao L M, et al. The genetic diversity centers of annual wild soybean in China [J] Acta Agronomica Sinica, 2000, 26(5): 521-527
[2] 田清震, 盖钧镒. 大豆起源与进化研究进展 [J]. 大豆科学, 2001, 20(1): 54-59 (Tian Q Z, Gai J Y. A review on the research of soybean origination and evolution [J]. Soybean Science, 2001, 20(1): 54-59)
[3] 董英山. 中国野生大豆研究进展 [J]. 吉林农业大学学报, 2008-30(4): 394-400 (Dong Y S. Advances of research on wild soybean in China [J]. Journal of Jilin Agricultural University, 2008, 30(4): 394-400)
[4] 赵丽梅, 董英山, 刘宝, 等. 中国一年生野生大豆(Glycine soja)核心资源构建 [J]. 科学通报, 2005, 50(10): 992-999 (Zhao L M, Dong Y S, Liu B, et al. Construction of core collections of annual wild soybean in China [J]. Chinese Science Bulletin, 2005, 50(10): 992-999)
[5] 刘长友, 田静, 范保杰. 河北省小豆种质资源遗传多样性分析 [J]. 植物遗传资源学报, 2009, 10(1): 73-76 (Liu C Y, Tian J, Fan B J. Genetic diversity analysis of adzuki bean germplasm in Hebei province [J]. Journal of Plant Genetic Resources, 2009, 10(1): 73-76)
[6] 董丽杰. 浅议辽宁省不同生态区优质大豆品种布局 [J]. 杂粮作物, 2006, 26(6): 424-425 (Dong L J. Preliminary studies on distribution of soybean varieties in different ecological areas of Liaoning province [J]. Rain Fed Crops, 2006, 26(6): 424-425)

- [7] 邱强,石一鸣,闫晓艳,等.吉林省不同生态区专用大豆产量和品质研究[J].耕作与栽培,2007(6):50-51(Qiu Q, Shi Y M, Yan X Y, et al. Research on yield and quality of soybean in different ecological areas of Jilin province [J]. Tillage and Cultivation, 2007(6):50-51)
- [8] 陈霞,杜维广,赵贵兴,等.黑龙江省不同生态区主栽大豆品种品质变化及评价研究初报[J].黑龙江农业科学,2001(1):6-7(Chen X, Du W G, Zhao G X, et al. Preliminary studies on quality change and evaluation of major soybean varieties in different ecological areas of Heilongjiang province [J]. Heilongjiang Agricultural Science, 2001(1):6-7)
- [9] 葛选良,史振声,李凤海.辽宁省不同生态区玉米产量及农艺性状差异研究[J].玉米科学,2013,21(1):75-78(Ge X L, Shi Z S, Li F H. Differences of yield and agronomy trait of maize in different ecological regions of Liaoning province [J]. Journal of Maize Sciences, 2013, 21(1):75-78)
- [10] 李文霞,李柏云,薛红,等.黑龙江省不同生态区大豆品种育种性状的主成分分析[J].大豆科学,2013,32(6):731-734.(Li W X, Li B Y, Xue H, et al. Principal components analysis of breeding traits in various ecological regions in Heilongjiang province [J]. Soybean Science, 2013,32(6):731-734)
- [11] 赵银月,保丽萍,耿智德,等.云南省大豆地方种质资源遗传多样性的初步分析[J].西南农业学报,2006,19(4):591-593(Zhao Y Y, Bao L P, Geng Z D, et al. Preliminary analysis of genetic diversity of local soybean germplasm in Yunnan [J]. Southwest China Journal of Agricultural Sciences, 2006,19(4):591-593)
- [12] 张煜,李娜娜,丁汉凤,等.野生大豆种质资源及创新应用研究进展[J].山东农业科学,2012,44(4):31-35(Zhang Y, Li N N, Ding H F, et al. Research progress of wild soybean germplasm and utilization [J]. Shandong Agricultural Sciences, 2012, 44(4):31-35)
- [13] 胡志昂,王洪新.研究遗传多样性的基本原理和方法[M]//马克平.生物多样性研究的原理与方法.北京:中国科学技术出版社,1994:117-122 (Hu Z A, Wang H X. Basic principle and method of the genetic diversity research [M] //Ma K P. Principle and method of the biodiversity research. Beijing: Science and Technology of China Press, 1994:117-122)
- [14] Wen Z X, Gai J Y. Genetic diversity and peculiarity of annual wild soybean(G.soja Sieb et Zuee)from various eco.regions in China [J]. Theoretical and Applied Genetics, 2009,119:371-381
- [15] Ratnaparkhe M B, Singh R J, Doyle J J, et al. Glycine [M] // Kole C. Wild crop relatives: Genomic and breeding resources. Legume Crops and Forages German: Springer Verlag Berlin Heidelberg (Press), 2011:83-116.
- [16] 徐豹,徐航,庄炳昌,等.中国野生大豆籽粒性状的遗传多样性及其地理分布[J].作物学报,1995,21(6):733-739. (Xu B, Xu H, Zhuang B C, et al. Polymorphism and geographical distribution of seed characters of wild soybean (G. soja) in China [J]. Acta Agronomica Sinica, 1995, 21(6):733-739)
- [17] Rodegers D M, Murphy J P, Frey K J. Impact of plant breeding on the grain yield and genetic diversity of spring oats [J]. Crop Science, 1983,23:737-740.
- [18] Groth J C. The concept and measurement of phenotypic diversity in Puccinia graminis on wheat [J]. Phytopathology, 1987, 77:1395-1399.
- [19] 庄炳昌,徐航,王玉民,等.中国野生大豆茎叶性状的多态性及其地理分布[J].作物学报,1996,22(5):583-586 (Zhuang B C, Xu H, Wang Y M, et al. Polymorphism and geographical distribution of stem characters of wild soybean (G. soja) in China [J]. Acta Agronomica Sinica, 1996,22(5):583-586.
- [20] 刘忠堂.黑龙江省大豆推广品种脂肪、蛋白质含量地理分布的研究[J].大豆科学,2002,21(4):250-252(Liu Z T. Study on the geographical distribution of the fat and protein content of soybean varieties released in Heilongjiang province [J]. Soybean Science, 2002, 21(4):250-252)
- [21] 李卫东,卢为国,梁慧珍,等.大豆蛋白质含量与生态因子关系的研究[J].作物学报,2004,30(10):1065-1068(Li W D, Lu W G, Liang H Z, et al. Effects of eco-physiological factors on soybean protein content [J]. Acta Agronomica Sinica, 2004, 30(10):1065-1068)
- [22] 李卫东,王树峰,卢为国,等.大豆脂肪含量与生态因子关系的研究[J].大豆科学,2006,25(2):127-132(Li W D, Wang S F, Lu W G, et al. Effects of ecological factors on soybean fat content [J]. Soybean Science, 2006, 25(2):127-132)
- [23] 张继君,张志良,陈红,等.重庆地区野生大豆资源考察与研究[J].大豆科学,2010,29(1):131-135(Zhang J J, Zhang Z L, Chen H, et al. Survey and study on the wild soybean germplasm resources in Chongqing [J]. Soybean Science, 2010, 29(1):131-135)
- [24] 王克晶,李向华.国家基因库野生大豆(Glycine soja)资源最近十年考察与研察[J].植物遗传资源学报,2012,13(4):507-514 (Wang K J, Li X H. Exploration and studies of wild in the China Genebank Soybean Germplasm Resources during recent decade [J]. Journal of Plant Genetic Resources, 2012, 13(4):507-514.

相似文献/References:

- [1] 高越,刘辉,陶波.抗草甘膦野生大豆筛选及其抗性生理机制研究[J]. (article.aspx?type=view&id=201301018) 大豆科学, 2013, 32(01):76. [doi:10.3969/j.issn.1000-9841.2013.01.018]
- GAO Yue, LIU Hui, TAO Bo. Screening and Physiological Mechanisms of Resistance to Glyphosate in Wild Soybeans (Glycine soja) [J]. Soybean Science, 2013, 32(03):76. [doi:10.3969/j.issn.1000-9841.2013.01.018]
- [2] 何?琳,刘业丽,裴宇峰,等.2012年黑龙江垦区大豆参试品系纯度鉴定、分子ID构建及遗传多样性分析[J]. (article.aspx?type=view&id=201305003) 大豆科学, 2013, 32(05):591. [doi:10.11861/j.issn.1000-9841.2013.05.0591]
- HE Lin, LIU Ye-li, PEI Yu-feng, et al. Purity Identification, Molecular ID Establishment and Genetic Diversity Analysis of Soybeans Attending Heilongjiang Reclamation Regional Test in 2012 [J]. Soybean Science, 2013, 32(03):591. [doi:10.11861/j.issn.1000-9841.2013.05.0591]
- [3] 王军卫,侯立江,李?登,等.野生大豆紫色酸性磷酸酶PAP1基因的克隆及分析[J]. (article.aspx?type=view&id=201305004) 大豆科学, 2013, 32(05):596. [doi:10.11861/j.issn.1000-9841.2013.05.0596]
- WANG Jun-wei, HOU Li-jiang, LI Deng, et al. Cloning and Sequence Analysis of Purple Acid Phosphatase PAP1 Gene in Wild Soybean [J]. Soybean Science, 2013, 32(03):596. [doi:10.11861/j.issn.1000-9841.2013.05.0596]
- [4] 王军卫,侯立江,李?登,等.野生大豆紫色酸性磷酸酶PAP1基因的克隆及分析[J]. (article.aspx?type=view&id=201305004) 大豆科学, 2013, 32(05):596.
- WANG Jun-wei, HOU Li-jiang, LI Deng, et al. Cloning and Sequence Analysis of Purple Acid Phosphatase PAP1 Gene in Wild Soybean [J]. Soybean Science, 2013, 32(03):596.
- [5] 王丽燕.硅对野生大豆幼苗耐盐性的影响及其机制研究[J]. (article.aspx?type=view&id=201305017) 大豆科学, 2013, 32(05):659. [doi:10.11861/j.issn.1000-9841.2013.05.0659]
- WANG Li-yan. Effects of Silicon on Salt Tolerance of Glycine soja Seedlings and Its Mechanism [J]. Soybean Science, 2013, 32(03):659. [doi:10.11861/j.issn.1000-9841.2013.05.0659]
- [6] 王卫卫,关大伟,马鸣超,等.东北地区大豆根瘤菌遗传多样性与系统发育研究[J]. (article.aspx?type=view&id=20130401) 大豆科学, 2013, 32(04):433. [doi:10.11861/j.issn.1000-9841.2013.04.0433]
- WANG Wei-wei, GUAN Da-wei, MA Ming-chao, et al. Genetic Diversity and Phylogeny of Soybean Rhizobia Isolated from Northeast China [J]. Soybean Science, 2013, 32(03):433. [doi:10.11861/j.issn.1000-9841.2013.04.0433]
- [7] 陈丽丽,王明玖,何丽君,等.野生大豆ISSR体系的优化及其在远缘杂交后代鉴定中的利用[J]. (article.aspx?type=view&id=20130406) 大豆科学, 2013, 32(04):459. [doi:10.11861/j.issn.1000-9841.2013.04.0459]
- CHEN Li-li, WANG Ming-jiu, HE Li-jun, et al. Optimization for ISSR Reaction System of Wild Soybean and Its Utilization in Distant Hybrid Identification [J]. Soybean Science, 2013, 32(03):459. [doi:10.11861/j.issn.1000-9841.2013.04.0459]
- [8] 郑世英,蔺蓓蓓,金桂芳. NaCl胁迫对野生大豆和栽培大豆叶绿素及光合特性的影响[J]. (article.aspx?type=view&id=20130411) 大豆科学, 2013, 32(04):486. [doi:10.11861/j.issn.1000-9841.2013.04.0486]
- ZHENG Shi-ying, LIAN Bei-Bei, JIN Gui-fang. Effect of NaCl Stress on Chlorophyll Content and Photosynthetic Characteristics of Glycine soja and Glycine max [J]. Soybean Science, 2013, 32(03):486. [doi:10.11861/j.issn.1000-9841.2013.04.0486]

- [9]陈丽丽, 刘晓冬, 赵洪银, 等. 福建涠洲岛烟豆(*G. tabacina*)遗传多样性分析[J]. (darticle.aspx?type=view&id=201303002)大豆科学, 2013, 32(03):286. [doi:10.11861/j.issn.1000-9841.2013.03.0286]
- CHEN Li-li, LIU Xiao-dong, ZHAO Hong-kun, et al. Genetic Diversity of *G. tabacina* from Meizhou Island of Fujian Province[J]. Soybean Science, 2013, 32(03):286. [doi:10.11861/j.issn.1000-9841.2013.03.0286]
- [10]徐艳平, 胡翠美, 张文会, 等. 干旱胁迫对野生大豆幼苗光合作用相关指标的影响[J]. (darticle.aspx?type=view&id=201303013)大豆科学, 2013, 32(03):341. [doi:10.11861/j.issn.1000-9841.2013.03.0341]
- XU Yan-ping, HU Cui-mei, ZHANG Wen-hui, et al. Effect of Simulated Drought Stress on Photosynthesis Related Indexes at Seedling Stage of Wild Soybeans[J]. Soybean Science, 2013, 32(03):341. [doi:10.11861/j.issn.1000-9841.2013.03.0341]
- [11]袁翠平, 赵洪银, 王玉民, 等. 利用SSR标记评价抗胞囊线虫野生大豆种质的遗传多样性[J]. (darticle.aspx?type=view&id=201402001)大豆科学, 2014, 33(02):147. [doi:10.11861/j.issn.1000-9841.2014.02.0147]
- YUAN Cui-ping, ZHAO Hong-kun, WANG Yu-min, et al. Genetic Diversity of Wild Soybean(*Glycine soja*)Resistant Germplasm to Soybean Cyst Nematode Revealed by SSR Markers[J]. Soybean Science, 2014, 33(02):147. [doi:10.11861/j.issn.1000-9841.2014.02.0147]
- [12]孙晓环, 刘晓冬, 赵洪银, 等. 吉林省龙井原保护区野生大豆遗传多样性分析[J]. (darticle.aspx?type=view&id=201203005)大豆科学, 2012, 31(03):358. [doi:10.3969/j.issn.1000-9841.2012.03.005]
- SUN Xiao-huan, LIU Xiao-dong, ZHAO Hong-kun, et al. Genetic Diversity of Wild Soybean(*G. soja*)from Longjing in-situ Conserved Region of Jilin Province[J]. Soybean Science, 2012, 31(03):358. [doi:10.3969/j.issn.1000-9841.2012.03.005]
- [13]吴禹, 沈军, 陈爱国, 等. 辽宁省野生大豆资源遗传多样性的比较分析[J]. (darticle.aspx?type=view&id=201203007)大豆科学, 2012, 31(03):368. [doi:10.3969/j.issn.1000-9841.2012.03.007]
- WU Yu, SHEN Jun, CHEN Ai-guo, et al. Genetic Similarity for Wild Soybeans from Different Geographical Origins in Liaoning Province[J]. Soybean Science, 2012, 31(03):368. [doi:10.3969/j.issn.1000-9841.2012.03.007]
- [14]曾维英, 梁江, 陈渊, 等. 广西新收集野生大豆资源的遗传多样性分析[J]. (darticle.aspx?type=view&id=201103006)大豆科学, 2011, 30(03):379. [doi:10.11861/j.issn.1000-9841.2011.03.0379]
- ZENG Wei-ying, LIANG Jiang, CHEN Yuan, et al. Genetic Diversity Analysis of New Wild Soybean Collection in Guangxi[J]. Soybean Science, 2011, 30(03):379. [doi:10.11861/j.issn.1000-9841.2011.03.0379]
- [15]魏苗, 李建东, 燕雪飞, 等. 中国东北野生大豆SSR遗传多样性及亲缘关系分析[J]. (darticle.aspx?type=view&id=201103008)大豆科学, 2011, 30(03):388. [doi:10.11861/j.issn.1000-9841.2011.03.0388]
- WEI Miao, LI Jian-dong, YAN Xue-fei, et al. Analysis of Genetic Diversity and Relationship of *Glycine soja* in Northeast China[J]. Soybean Science, 2011, 30(03):388. [doi:10.11861/j.issn.1000-9841.2011.03.0388]
- [16]李建东, 燕雪飞, 董思言, 等. 辽宁省野生大豆种质资源的SSR遗传多样性分析[J]. (darticle.aspx?type=view&id=201001006)大豆科学, 2010, 29(01):28. [doi:10.11861/j.issn.1000-9841.2010.01.0028]
- LI Jian-dong, YAN Xue-fei, DONG Si-yan, et al. Analysis of Genetic Diversity of *Glycine soja* Germplasm Resources in Liaoning Province[J]. Soybean Science, 2010, 29(01):28. [doi:10.11861/j.issn.1000-9841.2010.01.0028]
- [17]王丹, 乔亚科, 韩粉霞, 等. 河北东部沿海地区野生大豆SSR多样性分析[J]. (darticle.aspx?type=view&id=201004002)大豆科学, 2010, 29(04):555. [doi:10.11861/j.issn.1000-9841.2010.04.0555]
- WANG Dan, QIAO Ya-ke, HAN Fen-xia, et al. Genetic Diversity of *Glycine soja* in Eastern Coastal Area of Hebei Province[J]. Soybean Science, 2010, 29(04):555. [doi:10.11861/j.issn.1000-9841.2010.04.0555]
- [18]朴向民, 张圣珍, 许建, 等. 中国吉林省和韩国野生大豆的遗传多样性及遗传关系分析[J]. (darticle.aspx?type=view&id=200902001)大豆科学, 2009, 28(02):181. [doi:10.11861/j.issn.1000-9841.2009.02.0181]
- PIAO Xiang-min, JANG Seong-jin, HU Gung, et al. Genetic Diversity of Annual Wild Soybean (*Glycine Soja*) between China Jilin Province and Korean[J]. Soybean Science, 2009, 28(02):181. [doi:10.11861/j.issn.1000-9841.2009.02.0181]
- [19]张小明, 刘丽君, 唐晓飞, 等. 中俄大豆种质遗传多样性分析[J]. (darticle.aspx?type=view&id=200801003)大豆科学, 2008, 27(01):15. [doi:10.11861/j.issn.1000-9841.2008.01.0015]
- ZHANG Xiao-ming, LIU Li-jun, TANG Xiao-fei, et al. Genetic Diversity of Soybean Germplasm in Russia and China[J]. Soybean Science, 2008, 27(01):15. [doi:10.11861/j.issn.1000-9841.2008.01.0015]
- [20]董思言, 孙备, 李建东, 等. 微卫星分子标记在野生大豆遗传多样性研究中的应用[J]. (darticle.aspx?type=view&id=200801028)大豆科学, 2008, 27(01):145. [doi:10.11861/j.issn.1000-9841.2008.01.0145]
- DONG Si-yan, SUN Bei, LI Jian-dong, et al. Application of Microsatellite Molecular Marker in the Genetic Diversity of *Glycine soja*[J]. Soybean Science, 2008, 27(01):145. [doi:10.11861/j.issn.1000-9841.2008.01.0145]

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