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1. 一种黄淮北片抗赤霉病小麦育种的方法

中国农业科学院农业信息研究所

联系人：唐研

联系电话：0531-66657915

邮箱：agri@ckcest.cn

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▶ 前沿资讯

1. Development and validation of a mouse-based primary screening method for testing relative allergenicity of proteins from different wheat genotypes (一种基于小鼠初级筛选检测不同小麦基因型蛋白质相对致敏性方法的开发与验证)

简介: 小麦过敏症是一种严重的食物过敏疾病, 已达到全球公共卫生关注的重要水平。目前, 由于缺少适合的验证方法, 对不同小麦基因型过敏性的潜在变异研究还不充分。在此, 我们开发并验证了一种新的基于小鼠实验的初步筛选方法。用从小麦AABB基因型(硬粒、Carpio品种)中提取的盐溶性蛋白(SSP)对断奶后无植物蛋白饮食的Balb/c小鼠进行致敏实验。在确认过敏反应的临床致敏实验后, 小鼠在6个月的时间内被刺激7次。利用小型混合血浆库, 优化了小麦特异性IgE抑制(II)酶联免疫吸附试验。测定了四倍体(AABB)、六倍体(AABBDD)和二倍体(DD)小麦基因型SSPs的相对致敏性。使用IgE抑制曲线估计IC₅₀/IC₇₅值。抑制时间为2.5 h的优化II-ELISA的变异系数均小于2%。对相对过敏性的初步筛选表明, 与AABB-SSP结合的IgE被其他两个小麦基因型显著消除。与AABB相比, AABBDD和DD的SSPs相对过敏性显著降低(P<.01)。此外, 三个小麦基因型间的IgE抑制曲线显示出IC₅₀和IC₇₅的值有显著差异。本文首次介绍了一种基于小鼠检测实验的三种不同小麦基因型蛋白质相对过敏性的初步筛选方法, 该方法有望在小麦致敏性研究中得到广泛应用。

来源: Journal of Immunological Methods

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▶ 学术文献

1. Assessment of some genetic attributes in wheat (*Triticum aestivum* L.) using gene-specific molecular markers (利用基因特异性分子标记评价小麦(*Triticum aestivum* L.)的某些遗传特性)

简介: 利用基因特异性分子标记, 对24个小麦基因型进行了三个与应激相关遗传属性的表征。利用特异引物对从16个基因型的1RS黑麦染色体片段中获得约110bp的PCR产物, 表明这些品系中存在易位现象。同样的基因型被筛选出存在矮化基因, 其中19个基因型显示存在具有半矮化表型的Rht-B1b或Rht-D1b等位基因。其中两个基因型(kheri和Sufi)在基因座上都有野生型等位基因, 另外两个基因型显示存在双矮等位基因(Rht-B1b+Rht-D1b)。通过验证一个与小麦耐热性相关的单核苷酸多态性(SNP), 对一个16.9kDa的HSP基因进行了表征。24个基因型中有13个因单核苷酸多态性而未能扩增特定的聚合酶链反应产物, 有望显示对热应激的耐受性。在各个基因型中, Sonora-64、Balaka、Barkat、Aghrani和Bari-Gom-24(Prodip)对所有三个被评估的标记(rye易位、矮化基因和耐热性)均呈阳性。这些基因型可用于改善小麦的各种抗逆特性, 为今后的育种提供依据。

来源: Agriculture and Natural Resources

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2. The role of glutamine synthetase isozymes in enhancing nitrogen use efficiency of N-efficient winter wheat (谷氨酰胺合成酶在提高冬小麦氮素利用效率中的作用)

简介: Glutamine synthetase (GS) isozymes play critical roles in nitrogen (N) metabolism. However, the exact relationship between GS and nitrogen use efficiency (NUE) remain unclear. We have selected and compared two wheat cultivars, YM49 and XN509, which were identified as the N-efficient and N-inefficient genotypes, respectively. In this study, agronomical, morphological, physiological and biochemical approaches were performed. The results showed that TaGS1 was high expressed post-anthesis, and TaGS2 was highly expressed pre-anthesis in N-efficient genotype compared to N-inefficient genotype. GS1 and GS2 isozymes were also separated by native-PAGE and found that the spatial and temporal distribution of GS isozymes, their expression of gene and protein subunits in source-sink-flow organs during development periods triggered the pool strength and influenced the N flow. According to the physiological role of GS isozymes, we illustrated four metabolic regulation points, by which acting collaboratively in different organs, accelerating the transport of nutrients to the grain. It suggested that the regulation of GS isozymes may promote flow strength and enhance NUE by a complex C-N metabolic mechanism. The relative activity or amount of GS1 and GS2 isozymes could be a potential marker to predict and select wheat genotypes with enhanced NUE.

来源: Nature

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全文链接:

<http://agri.ckcest.cn/file1/M00/06/5C/Csgk0Fw8AiaALTGOADs-cfxULkw885.pdf>

3. Grain yield, adaptation and progress in breeding for early-maturing and heat-tolerant wheat lines in South Asia (南亚早熟耐热小麦品种的产量、适应性及育种进展)

简介: Maintaining wheat productivity under the increasing temperatures in South Asia is a challenge. We focused on developing early maturing wheat lines as an adaptive mechanism in regions suffering from terminal heat stress and those areas that require wheat adapted to shorter cycles under continual high temperature stress. We evaluated the grain yield performance of early-maturing heat-tolerant germplasm developed by CIMMYT, Mexico at diverse locations in South Asia from 2009 to 2014 and estimated the breeding progress for high-yielding and early-maturing heat-tolerant germplasm in South Asia. Each year the trial comprised of 28 new entries, one CIMMYT check (Baj) and a local check variety. Locations were classified by mega environment (ME); ME1 being the temperate irrigated locations with terminal high temperature stress, and ME5 as hot, sub-tropical, irrigated locations. Grain yield (GY), days to heading (DTH) and plant height (PH) were recorded at each location.

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Effect of temperature on GY was observed in both ME1 and ME5. Across years, mean minimum temperatures in ME1 and mean maximum temperatures in ME5 during grain filling had significant negative association with GY. The ME1 locations were cooler than those in ME5 in the 5 years of evaluations and had a 12 t/ha higher GY. A mean reduction of 20 days for DTH and 20 cm in PH was observed in ME5. Negative genetic correlations of -0.43 to -0.79 were observed between GY and DTH in South Asia during 2009-2014. Each year, we identified early-maturing germplasm with higher grain yield than the local checks. A positive trend was observed while estimating the breeding progress across five years for high-yielding early-maturing heat tolerant wheat compared to the local checks in South Asia. The results suggest the potential of the high-yielding early-maturing wheat lines developed at CIMMYT in improving wheat production and maintaining genetic gains in South Asia.

来源: Field Crops Research

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全文链接:

<http://agri.ckcest.cn/file1/M00/06/5C/Csgk0Fw8NM-ACucIAA0DHmaHb1E239.pdf>

➤ 相关专利

1. 一种黄淮北片抗赤霉病小麦育种的方法

简介: 本发明涉及一种黄淮北片抗赤霉病小麦育种的方法,属于小麦抗病育种领域。为了克服现有技术中赤霉病接种鉴定费工费时且发病效果差、抗赤霉病后代选择难度大的不足,本发明提供一种黄淮北片抗赤霉病小麦育种的方法,该方法包括育苗、气候箱培育、移栽及移栽后管理等步骤。本发明与冬季温室加代结合,一年种植小麦两代,相比一年一代,成倍加快抗赤霉病小麦选育进程。本发明抗赤霉病育种效率高、育种条件可控且稳定性高,适合在抗病小麦育种中推广应用。

来源: 国家知识产权局专利检索及分析

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