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小麦遗传育种专题

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1. 一种自动化小麦育种装置

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▶ 前沿资讯

1. Opportunities for wheat cultivars with superior straw quality traits targeting the semi-arid tropics (以半干旱热带地区为目标培育具有优良秸秆品质性状的小麦品种)

简介: 对印度和孟加拉国两处半干旱地区的50个小麦品种进行了连续2年的籽粒、秸秆产量及秸秆饲料品质性状调查。研究了氮(N)、中性洗涤纤维(NDF)、酸性洗涤纤维(ADF)、酸性洗涤木质素(ADL)、体外有机质消化率(IVOMD)、代谢能(ME)等饲料性状。各性状间均有极显著性差异($P < 0.0001$), 但地理位置和年份对各性状的影响一般大于系间。秸秆产量与草料品质性状无显著相关性, 而秸秆氮与籽粒产量、秸秆ADF与秸秆产量呈负相关($P=0.17$)。同一地区内的饲料品质差异略高于各地区的平均值。例如, ADF, 一个与小麦秸秆交易价格差异呈显著负相关的特征, 在不同地区的差异范围从49%–50.8%不等, 而在印度两个地区的差异范围从44.8%–47.8%和从47.2%–49.6%, 在孟加拉国的差异范围从53.9%–55.9%。ADF ($H^2=0.31$) 和ADL ($H^2=0.34$) 具有中等广义(H^2) 遗传力, 而其他饲料性状的 H^2 遗传力很低。通过对不同地区和年份的秸秆品质性状各品系间平均差异的推断, 最好的品系可以满足小麦秸秆交易中观察到的最高品质标准, 价格溢价分别为10%–17%, 取决于交易是发生在农村还是城市地区。

来源: Field Crops Research

发布日期: 2019-02-01

全文链接:

http://agri.ckcest.cn/file1/M00/06/68/Csgk0Fyh0POAeb_yAAgjbbrSLBU175.pdf

▶ 学术文献

1. Review: Revealing the genetic mechanisms of pre-harvest sprouting in hexaploid wheat (*Triticum aestivum* L.) (综述:揭示六倍体小麦收获前发芽的遗传机制)

简介: 小麦收获前发芽(PHS)是导致全球粮食产量和品质随天气变化而下降的重要现象。由于每年损失巨大, 培育抗PHS的品种具有重要意义。许多数量性状位点与PHS相关, 许多特定基因已被证实影响PHS。TaPHS1、TaMKK3、Tamyb10和TaVp1已被证明对PHS易感性有很大影响, 而许多其他基因, 如TaSdr、TaQsd和TaDOG1则被证明对PHS易感性有较小但显著的影响。在理解PHS背后的遗传学方面的研究进展, 使用分子选择和基因座堆叠成为影响这种数量性状的可行方法。本文旨在简要综述PHS相关的最新进展, 并对小麦PHS的遗传机制提供独特的见解。

来源: Plant Science

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全文链接:

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2. Development and genetic analysis of wheat double substitution

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lines carrying *Hordeum vulgare* 2H and *Thinopyrum intermedium* 2Ai#2 chromosomes (携带大麦2H和中间偃麦草2Ai#2染色体的小麦双代系的发育及遗传分析)

简介: *Thinopyrum intermedium* and barley are two close relatives of wheat and carry many genes that are potentially valuable for the improvement of various wheat traits. In this study we created wheat double substitution lines by hybridizing different wheatTh. intermedium and wheatbarley disomic alien substitution lines,with the aim of using genes in Th. intermediumand barley for wheat breeding and investigating the genetic behavior of alien chromosomes and theirwheat homoeologs. As expected, we obtained two types of wheat double substitution lines, 2D2Ai#2(2B)2H(2A) and 2A2Ai#2(2B)2H(2D), in which different group 2 wheat chromosomes were replaced by barley chromosome 2H and Th. intermedium chromosome 2Ai#2. The new materials were characterized usingmolecular markers, genomic in situ hybridization (GISH), and fluorescent in situ hybridization (FISH). GISH and FISH experiments revealed that the double substitution lines harbor 42 chromosomes including 38 wheat chromosomes, a pair of barley chromosomes, and a pair of Th. intermedium chromosomes. Analysis using specific DNAmarkers showed that two pairs of wheat homoeologous group 2 chromosomes in the new lines were substituted by a pair of 2H and a pair of 2Ai#2 chromosomes. Chromosome 2H showed a higher transmission rate than 2Ai#2, and both chromosomes were preferentially transmitted between generations via female gametes. Evaluation of botanic and agronomic traits demonstrated that, compared with their parents, the new lines showed similar growth habits and plant type but differences in plant height, flowering date, and self-fertility. Cytological observations using different probes suggested that the double substitution lines showed nearly normal genetic behavior before and during meiosis. The novel substitution lines can potentially be used in wheat meiosis research and breeding programs.

来源: The Crop Journal

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全文链接:

<http://agri.ckcest.cn/file1/M00/06/68/Csgk0Fyh1kuALyfvACaMmrebk08838.pdf>

3. Tocotrienols and tocopherols in colored-grain wheat, tritordeum and barley (色粒小麦、小麦和大麦中的生育三烯醇和生育酚)

简介: Colored-grain spring and winter wheat, spring tritordeum and barley (blue aleurone, purple pericarp, and yellow endosperm) from the harvests 2014 and 2015 were evaluated for tocol contents by HPLC-FD. Higher content of total tocols was found in spring wheat varieties compared with winter varieties. Four tocols (β -tocotrienol, α -tocotrienol, β -tocopherol, and α -tocopherol) were identified in wheat and tritordeum varieties. Dominant tocols in purple- and blue-grained wheat and yellow-grained tritordeum were α -tocopherol and β -tocotrienol, whereas spring barley varieties differed from wheat and tritordeum by high α -tocotrienol content. Tocol content was significantly affected by genotype and in a lesser extent in some varieties and lines also by rainfall and temperatures during crop year. Higher rainfall and lower temperatures caused in most varieties higher tocol contents. Purple- and

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blue-grained wheat lines with higher tocol, anthocyanin and phenolic acids with health benefits may be useful for breeding new varieties.

来源: Food Chemistry

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全文链接:

<http://agri.ckcest.cn/file1/M00/06/68/Csgk0Fyh09CAVtRdAA04tNn-dJE640.pdf>

➤ 相关专利

1. 一种自动化小麦育种装置

简介: 本发明提供了一种自动化小麦育种装置,包括装置本体,所述的装置本体底部一侧延伸有分支座,所述的分支座上安装有立柱,所述的立柱上设有太阳能电池板,所述的太阳能电池板导线连接设置在分支座上的电源装置,所述的装置本体内底部装有培养液,装置本体一侧壁上设有热风机,装置本体的另一侧设有控制箱,所述的装置本体的上部还设有提升装置,装置本体内侧壁上对称设有定位板,定位板上卡接有培养基,装置本体内还设有温湿度控制系统,本发明的有益效果为:自动化程度高,提高了生产效率,降低了工人劳动强度,节约能源。

来源: 国家知识产权局专利检索及分析

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全文链接:

<http://agri.ckcest.cn/file1/M00/06/68/Csgk0Fyh1yGAEsg0AA01EJR2kp4931.PDF>