2017年第24期总86期

粮食和食物安全专题快报

本期导读

前沿资讯

1. 在城市化世界中的粮食安全与营养
2. 协同创新齐推作物营养技术研究
3. 中国农科院作科所在航天诱变小麦耐盐机制研究上取得新进展

学术文献

1. RNAseq分析显示在空间飞行诱导的小麦突变体中与盐度耐受相关的途径和候选基因
2. 坦桑尼亚农业技术的可持续推荐领域

中国农业科学院农业信息研究所
联系人：顾亮亮
联系电话： 010-82109897
邮箱：agri@ckcest.cn
2017年6月12日

前沿资讯

1．Food Security and Nutrition in an Urbanizing World（在城市化世界中的粮食安全与营养）

简介：Hyper-urbanization and its implications for food security and nutrition in urban and rural areas is an urgent concern that has gained increasing attention over the years. The International Food Policy Research Institute (IFPRI), SNV Netherlands Development Organization, and Welthungerhilfe are jointly organizing a one-day event in Brussels on the eve of the European Development Days to explore the challenges and opportunities of urbanization from a variety of perspectives. Discussions will focus on disentangling myths about urban food security, rethinking informal markets, innovations and investments in rural-urban linkages, and sharing lessons learned from cases studies in Cambodia, Kenya, and Nepal.

来源：国际食物政策研究所（IFPRI）

发布日期:2017-06-06

全文链接:

http://www.ifpri.org/event/food-security-and-nutrition-urbanizing-world

2．协同创新齐推作物营养技术研究

简介：5月19日，由中国农业科学院生物技术研究所主持的“作物营养素代谢机理及营养强化关键技术”协同创新项目工作讨论会在北京召开。协同创新任务总指挥、中国农业科学院副院长李金祥出席会议并讲话。生物所所长林敏、党委书记王晓举出席会议，生物所副所长张春义主持会议。　　该协同创新任务主要由我国人群营养及作物营养强化标准制定、营养强化作物新品种培育、营养素吸收转运和代谢调控机理、营养强化作物加工关键技术、营养强化作物及食品的示范推广以及强化作物经济效益分析等6个子任务构成。6个子任务的首席专家分别汇报了子任务实施方案，与会专家围绕组织实施方式、主要研究内容和重大突破性成果等方面进行了深入研讨。　　李金祥指出，科技创新工程自启动以来在机制创新方面取得了显著成效。“十三五”期间，中国农科院将进一步围绕国家重大产业需求，凝练聚焦重大科学问题，深入推进协同创新任务。他强调，生物所要根据院党组对科技创新工程

来源：中国农业科学院生物技术研究所

发布日期:2017-06-01

全文链接:

http://www.caas.cn/xwzx/xzhd/283025.html

3．中国农科院作科所在航天诱变小麦耐盐机制研究上取得新进展

简介：近日，中国农业科学院作物科学研究所小麦育种技术与方法研究创新团队在航天诱变耐盐小麦突变体的抗盐胁迫机制研究方面取得新进展，通过对突变基因及盐胁迫响应差异表达谱两方面分析，揭示了参与突变体耐盐胁迫过程的关键代谢途径及基因，并阐明了空间诱发突变体的转录组变异特征。相关研究论文“RNAseq analysis reveals pathways and candidate genes associated with salinity tolerance in a

spaceflight-induced wheat mutant”于2017年6月2日在线发表在Scientific Reports期刊。土壤盐渍化是作物面临的主要非生物胁迫之一，严重影响作物的产量和品质。探究小麦耐盐的机理具有重要的科学意义。作物遭受盐胁迫时，通过体内相应的生理生化反应进行调节，如离子吸收、抗氧化酶的诱导、植物激素的调节等。作物耐盐胁迫过程与相关代谢过程及关键基因密切相联。该团队利用航天诱变技术，结合苗期耐盐性鉴定，筛选获得了一个小麦耐盐突变体st1。相对于野生型，st1突变体在高盐处理后的发芽率显著提高。高盐处理生长5天后，st1地上部重显著高于野生型，同时Na+浓度和丙二醛含量较野生型显著降低。对野生型和st1转录组突变位点分析，表明SNP数目要远多于InDel，且SNP突变中嘌呤与嘌呤及嘧啶与嘧啶之间转换（transition）的数目是嘌呤与嘧啶之间颠换（transversion）的SNP数目的2倍，四种颠换类型中G和C之间的颠换数目最多。对突变基因GO富集分析发现两个突变基因富集在“sodium ion transport”过程中，可能直接参与st1突变体的耐盐胁迫。进一步分析盐胁迫响应的野生型和st1转录组表达谱，表明氧化还原过程，淀粉和蔗糖代谢、半乳糖代谢及亚油酸代谢等的调节在st1突变体耐盐过程中发挥重要作用。此外，对响应盐胁迫且在耐盐st1中高表达的基因进行分析，探讨了参与st1突变体耐盐胁迫过程的其它关键基因，包括编码精氨酸脱羧酶、多胺氧化酶的基因、氧化还原与激素相关基因及一些转录因子。该研究将为培育耐盐小麦新品种提供新材料和新思路。航天诱变机理研究一直是本领域研究的重点和难点问题，主要通过空间诱变环境要素分析和诱变后代的变异特征分布两种策略展开研究。本研究对M5代航天诱变突变体的转录组变异位点分析，结合其它诱变因素诱发的转录组序列变异情况，首次揭示了航天诱变突变体的转录组序列变异特征。

来源：中国农业科学院作物科学研究所

发布日期:2017-06-05

全文链接:

http://icscaas.com.cn/Html/2017_06_05/17968_18131_2017_06_05_117322.html

学术文献

1．RNAseq analysis reveals pathways and candidate genes associated with salinity tolerance in a spaceflight-induced wheat mutant（RNAseq分析显示在空间飞行诱导的小麦突变体中与盐度耐受相关的途径和候选基因）

简介：Salinity stress has become an increasing threat to food security worldwide and elucidation of the mechanism for salinity tolerance is of great significance. Induced mutation, especially spaceflight mutagenesis, is one important method for crop breeding. In this study, we show that a spaceflight-induced wheat mutant, named salinity tolerance 1 (st1), is a salinity-tolerant line. We report the characteristics of transcriptomic sequence variation induced by spaceflight, and show that mutations in genes associated with sodium ion transport may directly contribute to salinity tolerance in st1. Furthermore, GO and KEGG enrichment analysis of differentially expressed genes (DEGs) between salinity-treated st1 and wild type suggested that the homeostasis of oxidation-reduction process is important for salt tolerance in st1. Through KEGG pathway analysis, “Butanoate metabolism” was identified as a new pathway for salinity responses. Additionally, key genes for salinity tolerance, such as

genes encoding arginine decarboxylase, polyamine oxidase, hormones-related, were not only salt-induced in st1 but also showed higher expression in salt-treated st1 compared with salt-treated WT, indicating that these genes may play important roles in salinity tolerance in st1. This study presents valuable genetic resources for studies on transcriptome variation caused by induced mutation and the identification of salt tolerance genes in crops.

来源：Scientific Reports 期刊

发布日期:2017-06-02

全文链接:

http://agri.ckcest.cn/ass/NK001-20170612003.pdf

2．Sustainable recommendation domains for scaling agricultural technologies in Tanzania（坦桑尼亚农业技术的可持续推荐领域）

简介：Low adoption of sustainable intensification technologies hinders achievement of their potential impacts on increasing agricultural productivity. Proper targeting of locations to scale-out particular technologies is a key determinant of the rate of adoption. Targeting locations with similar biophysical and socio-economic characteristics significantly increases the probability of adoption. Areas with similar biophysical and socio-economic characteristics are referred to as recommendation domains (RDs). This study used geospatial analysis to delineate sustainable recommendation domains (SRDs) for scaling improved crop varieties and good agronomic practices in Tanzania. The study uses K-means clustering to identify relatively similar clusters from grid raster's representing biophysical and socio-economic environments. Critical ecosystems are masked-out from the clusters to generate the SRDs. The potential impacts of scaling technologies in the generated SRDs were assessed and a spatial targeting index developed. Results identify 20 SRDs and the bio-socio-economic gradients that delineate them. This study proposes an Impact Based Spatial Targeting Index (IBSTI) as an objective tool for priority setting when scaling agricultural technologies. IBSTI identified priority areas within each SRD that should be targeted to maximize potential impacts of a scaling intervention. The data-driven clustering method is recommended for regions with limited technology trials. Results demonstrate the potential of geospatial tools in generating evidence-based policies on scaling of sustainable intensification technologies.

来源：Land Use Policy 期刊

发布日期:2017-07

全文链接:

http://agri.ckcest.cn/ass/NK001-20170612005.pdf