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粮食和食物安全专题快报

本期导读

前沿资讯

科技报告

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前沿资讯

1. Increasing food production without damaging the environment（在不损害环境的前提下扩大粮食生产）

简介：To achieve sustainable development we must transform current agriculture and food systems, including by supporting smallholders and family farmers, reducing pesticide and chemical use, and improving land conservation practices, FAO Director-General José Graziano da Silva said today addressing European lawmakers. Massive agriculture intensification is contributing to increased deforestation, water scarcity, soil depletion and the level of greenhouse gas emission, Graziano da Silva said. He stressed that while high-input and resource intensive farming systems have substantially increased food production, this has come at a high cost to the environment. Today, it is fundamental not only to increase production, but to do it in a way that does not damage the environment. Nourishing people must go hand in hand with nurturing the planet, he said. This is in line with the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change, he added. We have to move from input intense to knowledge intense production systems, the FAO Director-General said.

来源：联合国粮农组织（FAO）

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全文链接:

http://www.fao.org/news/story/en/item/889671/icode/

2．中国农科院作科所研究揭示小麦幼穗发育基因调控特点

简介：近日，由中国农业科学院作物科学研究所毛龙研究员领衔的作物生物信息与应用创新团队，在小麦幼穗发育基因调控网络解析研究中取得新进展，在系统研究小麦幼穗发育早期四个决定后期穗粒数重要阶段基因表达的差异后，解释了这一重要时期基因表达调控的特点。相关成果于5月17日在线发表在国际植物学主流杂志《植物生理（Plant Physiology）》上。 据悉，小麦穗的发育经历二棱期、小穗发育期、小花发育期、小花成熟期等关键时期。其中，二棱期是小穗发育初始时期，决定小穗原基的多少；小穗发育期是小花原基形成的时期，决定小花数目的多少；小花发育期则决定小花原基能否成功发育成小花，而小花成熟期是雌雄蕊发育期，决定小花的育性。小麦的每个小穗能产生多到8个以上的小花原基；但最后只有3-4个能够发育生成籽粒。因此，小麦穗发育的早期状态直接影响小麦的最终产量。但是，迄今为止，人们对该过程中的基因调控及网络却知之不多。 科研团队利用生物信息手段，通过对小麦幼穗发育早期的转录组分析发现，该过程中小麦基因表达活跃、表达模式多样。根据基因表达的聚类分析及其特异阶段的重要基因挖掘，发现了大量与幼穗发育相关的重要转录因子。其中，很多与模式植物如水稻的调控基因保守。该团队同时对小麦幼穗的小分子核糖核酸（RNA）进行了分析，发现重要小分子RNA如miR159、miR167、miR319、miR396等高度表达，与其靶基因的表达模式协同，并能进行有效切割、调控。为了证明他们的分析结果的可靠性，该团队对其中一个在小花发育期高表达的基因AGO1d进行了突变体分析。该基因在花药的绒粘层特异表达；突变后使小麦的可育花粉数目大大下降，严重影响后期的每穗籽粒数。这一工作表明，转录组分析发现的调控基因在小麦花序的发育过程中发挥重要的作

用。这些候选基因可为今后分子育种中开发分子标记和进行遗传操作提供重要的信息。
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科技报告

1．Agricultural transformation in Sri Lanka: policy implications and way forward（斯里兰卡农业转型：政策影响与前进方向）

简介：Sri Lanka continues to experience strong economic growth over the recent years. In the food and agriculture sector, however, there are several conspicuous policy changes that require attentive analysis. Also, since 2008, agriculture growth slowed down due to drought and weak global demand which affected exports and trade. This brief takes stock of key food and agricultural indicators and provides key recommendations to further expedite the transformation of the sector. Sri Lanka has come a long way in terms of agricultural transformation, moving from subsistence- based agrarian economy towards early integration stage. But further progress towards market- oriented industrialized agriculture will crucially depend on the policy, institutional, and technological innovations that are designed and implemented by the Government. The government of Sri Lanka has been pursuing large-scale reconstruction and development projects to achieve higher growth by developing small and medium enterprises and to increase agricultural productivity.
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http://agri.ckcest.cn/ass/NK001-20170605003.pdf

2．Does improved irrigation technology save water?（改进灌溉技术能节约用水吗？）

简介：Unsustainable water use (over-drafted aquifers, seasonally dry rivers, disappearing lakes and wetlands) is a problem across the world. This is especially true in the NENA region, which includes many of the most water-short countries in the world. This review indicates that there are rather few examples of carefully documented impacts of hi-tech irrigation, while there are many examples of projects and programs that assume that water will be saved and productivity increased. The conclusion of this report is that restoring a balance between sustainable supply and consumption of water requires first physical control of the water resource by government or other agencies responsible for sustainable use, followed by interventions to reduce allocations. Within the allocated and controlled quotas, hi-tech irrigation will evolve and spread to the extent that it makes sense for the farmer who wishes to take advantage of the various benefits of hi-tech irrigation.
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学术文献

1. Transcriptome of wheat inflorescence development from spikelet initiation to floral patterning(从小麦幼穗发育到花卉图案的小麦花序发育基因转录调控)

简介： Early reproductive development in cereals is crucial for final grain number per spike, and hence the yield potential of the crop. To date, however, no systematic analyses of gene expression profiles during this important process have been conducted for common wheat (Triticum aestivum). Here, we studied the transcriptome profiles at four stages of early wheat reproductive development, from spikelet initiation to floral organ differentiation. K-means clustering and stage-specific transcript identification detected dynamically expressed homoeologs of important transcription regulators in spikelet and floral meristems that may be involved in spikelet initiation, floret meristem specification, and floral organ patterning, as inferred from their homologs in model plants. Small RNA transcriptome sequencing discovered key microRNAs that were differentially expressed during wheat inflorescence development alongside their target genes, suggesting that miRNA-mediated regulatory mechanisms for floral development may be conserved in cereals and Arabidopsis. Our analysis was further substantiated by the functional characterization of the ARGONAUTE 1d (AGO1d) gene, which was initially expressed in stamen primordia and later in the tapetum during anther maturation. In agreement with its stage-specific expression pattern, the loss of function of the predominantly expressed B homoeolog of AGO1d in a tetraploid durum wheat mutant resulted in smaller anthers with more infertile pollens than the wild type, and a reduced grain number per spike. Together, our work provides a first glimpse of the gene regulatory networks in wheat inflorescence development that may be pivotal for floral and grain development, highlighting potential targets for genetic manipulation to improve future wheat yields.

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