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蔬菜育种专题

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中国农业科学院农业信息研究所
联系人：张晓静；祁冉；顾亮亮
联系电话：010-51503648
邮箱：agri@ckcest.cn
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▶ 前沿资讯

1. Plant Physiology | 华中农业大学番茄团队揭示线粒体脂肪酸合成途径对植物发育和环境响应的重要作用

简介: 近日,华中农业大学番茄团队欧阳波教授实验室在Plant Physiology发表了题为“Critical Roles of Mitochondrial Fatty Acid Synthesis in Tomato Development and Environmental Response”的研究论文,揭示了线粒体脂肪酸合成途径在番茄发育中的重要作用。

该研究鉴定了一个植株矮化、腋芽增生、叶片卷曲发黄的番茄自发突变体fern-like,通过遗传定位确定该突变体由一个编码MaoC-脱水酶的基因S1FERN发生单碱基替换导致,FERN参与mtFAS碳链延伸的核心步骤。fern-like的表型受到光强、二氧化碳以及活性氧影响。mtFAS产生的辛酸能在线粒体中转化为硫辛酸,为参与光呼吸的甘氨酸脱羧酶复合体(GDC)提供辅因子,因此FERN影响了光呼吸过程。但fern-like与典型的光呼吸突变体表型差异明显,通过对番茄叶片以及线粒体和叶绿体的脂质组分析,发现突变体的线粒体膜脂及其他相关脂质的构成发生了明显改变,暗示mtFAS在线粒体脂质构成上也发挥重要作用。

综上,该研究首次在番茄中通过正向遗传学手段鉴定到线粒体脂肪酸合成的基因突变,并发现mtFAS除了参与光呼吸外还可能通过影响线粒体膜脂参与植株发育调控。

来源: 植物生物技术Pbj

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<http://agri.ckcest.cn/file1/M00/03/32/Csgk0YbsY6qANrdCAAuNvQ990h4839.pdf>

2. Biotechnol Biofuels Bioprod | 江苏大学谭小力团队揭示甘蓝型油菜花青素突变体(am)的耐渍机制

简介: 近日, Biotechnology for Biofuels and Bioproducts (原Biotechnology for Biofuels, 中科院分区工程技术1区期刊, IF 6.04) 杂志在线发表了江苏大学谭小力研究员团队题为“Physiological and comparative transcriptome analyses reveal the mechanisms underlying waterlogging tolerance in a rapeseed anthocyanin-more mutant”的研究论文。

花青素作为植物中最重要天然色素之一,不仅有利于植物传粉及种子传播,同时在逆境胁迫方面发挥重要作用。花青素突变体在甘蓝型油菜中非常罕见。本课题组前期研究发现了一个甘蓝型油菜品种“中双11”(ZS11)的花青素高含量(anthocyanin-more, am)自然突变体。该突变体由于在不同发育阶段花青素的积累,呈现明显的紫色,而野生型无此表型。本研究以ZS11及其多花青素(am)突变体为材料,研究了萌发期油菜在渍水胁迫下的生理变化和转录组差异。结果发现,与ZS11相比,am突变体表现出更强的耐渍性。渍水12d后,突变体的花青素、渗透调节物质和丙二醛含量显著增加,而叶绿素含量显著降低。RNA-seq分析发现,ZS11和am中分别有1370和2336个差异表达基因(DEGs)对渍水胁迫作出响应。富集分析表明,ZS11中的DEGs主要参与碳水化合物代谢,而am突变体中的DEGs则主要富集于植物激素信号转导和对内源刺激的反应。其中,共有299个DEGs被鉴定为花青素生物合成相关结构基因和编码转录因子的调控基因,这可能解释了am突变体中花青素含量增加的原因。110个DEGs聚集在植物激素信号转导途径,

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其中70个参与生长素和乙烯信号转导的DEGs在突变体中发生了显著变化。此外，利用实时定量PCR验证了16个在花青素积累和生物/非生物胁迫反应中可能发挥作用的DEGs，它们的表达水平与转录组图谱一致。该项目的开展不仅可以增加我们对花青素产生的转录调控机制和花青素易诱导突变体耐渍机制的理解，同时也为进一步鉴定候选基因及耐涝油菜的分子育种奠定基础。

来源：植物生物技术Pbj

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科技图书

1 . Advances in Legumes for Sustainable Intensification (豆科植物可持续集约化研究进展)

简介: Advances in Legume-based Agroecosystem for Sustainable Intensification explores current research and future strategies for ensuring capacity growth and socioeconomic improvement through the utilization of legume crop cultivation and production in the achievement of sustainability development goals (SDGs). Sections cover the role of legumes in addressing issues of food security, improving nitrogen in the environment, environmental sustainability, economic-environmentally optimized systems, the importance and impact of nitrogen, organic production, and biomass potential, legume production, biology, breeding improvement, cropping systems, and the use of legumes for eco-friendly weed management. This book is an important resource for scientists, researchers and advanced students interested in championing the effective utilization of legumes for agronomic and ecological benefit.

来源: Elsevier

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<http://agri.ckcest.cn/file1/M00/03/32/Csgk0YbsZauAI4FIAAXsc41yxLQ063.pdf>

2 . Advances in Plant Tissue Culture-Current Developments and Future Trends (植物组织培养研究进展)

简介: Advances in Plant Tissue Culture: Current Developments and Future Trends provides a complete and up-to-date text on all basic and applied aspects of plant tissue cultures and their latest application implications. It will be beneficial for students and early-career researchers of plant sciences and plant/agricultural biotechnology. Plant tissue culture has emerged as a sustainable way to meet the requirements of fresh produces, horticultural crops, medicinal or ornamental plants. Nowadays, plant tissue culture is an emerging field applied in various aspects, including sustainable agriculture, plant breeding, horticulture and forestry. This book covers the latest technology, broadly applied for crop improvement, clonal propagation, Somatic hybridization Embryo rescue, Germplasm conservation, genetic

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conservation, or for the preservation of endangered species. However, these technologies also play a vital role in breaking seed dormancy over conventional methods of conservation.

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<http://agri.ckcest.cn/file1/M00/03/32/Csgk0YbsZjGAAwz3AAXY1m0XmS8004.pdf>

3 . New Paradigms in Environmental Biomonitoring Using Plants (利用植物进行环境生物监测的新模式)

简介: New Paradigms in Environmental Biomonitoring Using Plants highlights and explores the importance of biomonitoring methodologies and the latest updates in the field. The book presents a holistic approach toward the different aspects of biomonitoring, focusing mainly upon the inclusion of newly emerging concepts of environmental genomics, metabarcoding, and cheminformatics and biomarkers, among other technologies; helping to explore and establish a new outlook for biomonitoring frameworks. This book compiles all aspects of biomonitoring including traditional and modern techniques, using a multidimensional approach without focusing on any specific pollutant. Most biomonitoring programs implemented until now have focused more on traditional methods. This book covers new approaches to biomonitoring that could improve on the currently limited capabilities of existing schemes. The book highlights the possible scope for enriching existing datasets and characterizing biodiversity in situ in a far more complete way than has been possible previously. New Paradigms in Environmental Biomonitoring Using Plants will be important for researchers, academics, postgraduates and undergraduate students in environmental, plant, crop and soil sciences, to provide up-to-date and emerging technologies in biomonitoring for environmental assessment, leading to a new vision of biomonitoring. It will also be helpful for risk assessment professionals and stakeholders involved in planning the future biomonitoring programs.

来源: Elsevier

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