2022年第43期总366期

蔬菜育种专题

本期导读

学术文献

1.24-表油菜素内酯(EBR)处理对西兰花黄变过程中硫代葡萄糖苷含量变化的影响

2. 芥菜（芸苔属）种群的分布和遗传特征及草甘膦抗性渗入分析

3.BoPIF4和BobHLH66调控西兰花叶绿素和类胡萝卜素代谢机制的研究

4.生理学和蛋白质组学揭示黄腐酸减轻镉对生菜生长和光合特性的不利影响

5. 硒提高植物重金属胁迫耐受性的生理机制研究进展

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
2022年10月24日

学术文献

1. Insights into Profiling of 24-Epibrassinolide Treatment Alleviating the Loss of Glucosinolates in Harvested Broccoli(24-表油菜素内酯(EBR)处理对西兰花黄变过程中硫代葡萄糖苷含量变化的影响)

简介：Postharvest yellowing is accompanied by the rapid nutrition deterioration of broccoli. Here, we investigated the effect of 24-epibrassinolide (EBR) treatment on the change of glucosinolates content during the yellowing of broccoli. EBR treatment maintained the content of glucosinolates, as indicated by higher levels of glucoraphanin, glucobrassicin, and neoglucobras-sicin. Meanwhile, the transcript levels of BoCYP83A1 and BoCYP83B1 as well as BoMYB28, BoMYB34, and BoMYB122 involved in the glucosinolates biosynthesis pathway were upregulated in the treatment sample. Furthermore, the expressions of BoBRI1 gene and crucial transcription factors BoBZR1 and BoBES1 that participated in the brassinosteroids signal trans-duction pathway were activated under EBR treatment, which indirectly alleviated the decrease of glucosinolates content. Orthogonal partial least square model and pathway analysis further demonstrated that the improvement of glucosinolate biosynthetic ability and the enhancement of brassinosteroids signal transduction might be the mechanism responsible for the conservation of glucosinolates by EBR treatment.

来源：Food and Bioprocess Technology

发布日期:2022-09-26

全文链接:

http://agri.ckcest.cn/file1/M00/03/41/CsgkOYevQBOAJkm7AGvnJ_meAuA860.pdf

2. Distribution and genetic characterization of bird rape mustard (Brassica rapa) populations and analysis of glyphosate resistance introgression(芥菜（芸苔属）种群的分布和遗传特征及草甘膦抗性渗入分析)

简介：The introgression of a transgene conferring glyphosate resistance from Bras-sica napus (rapeseed, canola) to Brassica rapa weeds (bird rape) was documented at a single location in 2007. In 2015, several cases of glyphosate resistant mustard were reported by growers in areas where rapeseed was seldom grown.

Survey result indicated glyphosate resistant bird rape mustard is present in areas where glyphosate tolerant corn and soybean are often grown in rotation. Genetic analyses reveal that hybridization followed by introgression and progressive loss of chromosome is the likely mechanism for the horizontal gene transfer (HGT) of glyphosate resistance.

Introgression of the glyphosate-resistance conferring transgene in the populations studied appears to have occurred several times, consistent with the ease for B. rapa to form hybrids with B. napus. The introduction of a transgene into a crop should therefore take into account the weediness of the species that share a common genome and their ability to form hybrids. We pro-vide here such an example between B. napus and B. rapa, and potentially between B. napus and Raphanistrum raphanistrum.

来源：Pest Management Science
发布日期:2022-09-06
全文链接:
http://agri.ckcest.cn/file1/M00/03/41/CsgkOYevQWGAByXfAB19tr9x-_E987.pdf

3．Insights into the mechanism of chlorophyll and carotenoid metabolism regulated by BoPIF4 and BobHLH66 in broccoli（BoPIF4和BobHLH66调控西兰花叶绿素和类胡萝卜素代谢机制的研究）

简介：Postharvest broccoli tends to fade from green to yellow, which is closely associated with pigment metabolism. Numerous genes involved in chlorophyll metabolism and carotenoid biosynthesis pathway in broccoli have been identified, but the underlying transcriptional regulation mechanism of these genes remains unclear. Here, two bHLH transcription factors, designated as BoPIF4 and BobHLH66, were characterized from broccoli, which were conspicuously induced during senescence. BoPIF4 and BobHLH66 were both localized exclusively in nucleus and had transactivation ability. Intriguingly, these two transcriptional regulators BoPIF4/BobHLH66 separately recognized the binding elements (G-box and GCACGTGC) in the promoters of BoCAO and BoHYD, and facilitated their transcription. Furthermore, the transient expression assay of BoPIF4/BobHLH66 in 'Naihan-Youxiu' broccoli and calli demonstrated that they were the positive regulators of BoCAO and BoHYD. The functions of BoPIF4 and BobHLH66 have been further verified in the genetic transformation system of Arabidopsis thaliana. Collectively, these findings suggest that BoPIF4/BobHLH66 may function as a vital component of the senescence-regulating module in broccoli through transcriptional activation of BoCAO and BoHYD.
来源：Postharvest Biology and Technology
发布日期:2022-08-23
全文链接:
http://agri.ckcest.cn/file1/M00/10/13/CsgkOGNYi2eAYAEYAGsXgq7bByc869.pdf

4．Physiology and proteomics reveal Fulvic acid mitigates Cadmium adverse effects on growth and photosynthetic properties of lettuce（生理学和蛋白质组学揭示黄腐酸减轻镉对生菜生长和光合特性的不利影响）

简介：Understanding the molecular mechanisms of plants in response to Cd stress is crucial for improving plants adaptation to Cd stress. Fulvic acid (FA) is an active humic substance that is often used as a soil conditioner. However, there are few reports on the role of FA against Cd stress. The aim of this study was to determine the effects of Fulvic acid on alleviation of Cd toxicity in lettuce (Lactuca sativa L) under hydroponic conditions. Our results showed that 20 μmol/L Cd stress significantly reduced photosynthetic pigment metabolism and the expression of photosynthetic apparatus-related proteins, thereby inhibiting photosynthetic electron transport, net photosynthetic rate and negatively affecting photosynthetic carbon assimilation and growth of lettuce. However, proteomic findings

suggest that the application of FA can reduce the adverse effects of Cd contami-nation. Compared to Cd stress alone, FA significantly increased the expression of Light-harvesting proteins, re-action center and electron transport-related proteins. Further results showed that FA at 0.5 g/L reduced the uptake of Cd by the roots, resulting in a 23.5% reduction in total Cd content in lettuce. Moreover, FA enhanced S metabolism and rebuilt redox homeostasis in cells. Overall, these findings provide new insights into the mech-anism of cadmium toxicity mitigation in lettuce by FA. Which is recommended as an eco-friendly tool for improving the photosynthesis performance and biomass of lettuce under Cd stress.

来源：Plant Science

发布日期:2022-08-18

全文链接:

http://agri.ckcest.cn/file1/M00/03/41/CsgkOYevQhSAOR1aADlLICplSzA211.pdf

5. Advances in physiological mechanisms of selenium to improve heavy metal stress tolerance in plants(硒提高植物重金属胁迫耐受性的生理机制研究进展)

简介：Selenium (Se) is a metalloid mineral nutrient for human and animal health. Plants are the main foodstuff source of the Se intake of humans. For plants, the addition of an appropriate amount of Se could promotes growth and development, and improves the tolerance to environmental stress, especially stress from some of heavy metals (HM) stress, such as cadmium (Cd) and mercury (Hg). This paper mainly reviews and sum-marizes the physiological mechanism of Se in enhancing HM stress tolerance in plants. The antagonistic effect of Se on HM is a comprehensive effect that includes many physiological mechanisms. Se can promote the removal of excessive reactive oxygen species and reduce the oxidative damage of plant cells under HM elements stress. Se participates in the regulation of the transportation and distribution of HM ions in plants, and alleviates the damage caused by of HM stress. Moreover, Se com-bine with HM elements to form Se-HM complexes and promote the production of phytochelatins (PCs), thereby reducing the accumulation of HM ions in plants. Over-all, Se plays an important role in plant response to HM stress, but current studies mainly focus on physiological mechanism, and further in-depth study on the molecu-lar mechanism is essential to confirm the participation of Se in plant response to envi-ronmental stress. This review helps to comprehensively understand the physiological mechanism of Se in plant tolerance against to HM stress of plants, and provides important theoretical support for the practical application of Se in environmental remediation and agricultural development.

来源：Plant Biology

发布日期:2022-05-18

全文链接:

http://agri.ckcest.cn/file1/M00/10/13/CsgkOGNYjz2ANTLGABFkjZTRz_E363.pdf