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茶学研究专题

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学术文献

1. Plant immunity research in China (中国植物免疫研究)

简介: Throughout history, humans have battled with plant diseases since the beginning of agricultural civilization. In ancient cultures, people appealed to gods for bountiful harvests. It wasn't until the late blight epidemic in Ireland in 1845 that had led significant discoveries pertaining to the famine and gave rise to plant pathology. Miles J. Berkeley and Anton de Bary's experiments, which transferred pathogen spores to healthy plants, demonstrated that plants became sick due to pathogen infection, establishing that pathogen infection causes disease. These findings underpinned the foundation for modern plant pathology. A crucial breakthrough was Harold Flor's famous 'gene-for-gene' hypothesis in the 1970s (Flor 1971). The concept of 'plant innate immunity' emerged, advancing the field substantially over the last three decades. Along with the fast development of plant immunity research worldwide, the Chinese community has also made significant contributions in the last two decades. In China, the exact time for the concept of 'plant pathology' established is difficult to verify textually, but the teaching of plant pathology can be traced back to the year 1910, and the first Department of Plant Pathology and Pests was established in 1921, the time that Southeast University offered plant pathology classes for students. The history of plant pathology in China is relatively short, spanning just over a century, but the Chinese community has become a significant player in the field. In this special issue, we provide a brief overview of the Chinese community's contributions to plant pathology/immunity from a century-long perspective.

来源: Phytopathology Research 期刊

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2. Nanostructure-Derived Antireflectivity in Leafhopper Brochosomes (叶蝉网粒体纳米结构衍生的抗反射性)

简介: Understanding how insect-derived biomaterials interact with light has led to new advances and interdisciplinary insights in entomology and physics. Leafhoppers are insects that coat themselves with highly ordered biological nanostructures known as brochosomes. Brochosomes are thought to provide a range of protective properties to leafhoppers, such as hydrophobicity and antireflectivity, which has inspired the development of synthetic brochosomes that mimic their structures. Despite recent progress, the high antireflective properties of brochosome structures are not fully understood. Herein, a combination of experiments and computational modeling is used to understand the structure-, material-, and polarization-dependent optical properties of brochosomes modeled on the geometries found in three leafhopper species. The results qualitatively represent that light interference interaction with nanostructures naturally occurring in brochosomes is responsible for the spectral tuning and the asymmetric line shape of the reflectance spectra. Whereas prior work has focused on the computational modeling of idealized pitted particles, this work shows that light-matter interactions with brochosome structures can be tuned by varying the geometry of their cage-like nanoscale features and by changing the arrangement of multiparticle assemblies. Broadly, this work establishes principles for the guided design of new optically active

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materials inspired by these unique insect nanostructures.

来源: Advanced Photonics Research 期刊

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3 . Caffeoylputrescine-hexenal-mediated nonhost resistance against leafhoppers (咖啡酰丁二胺-己烯醛介导的非寄主对叶蝉的抗性)

简介: Despite its critical role in repelling damaging insects, our understanding of nonhost resistance against herbivores remains very limited. Recently, Bai et al. identified a novel caffeoylputrescine-green leaf volatile (GLV) compound in wild tobacco plants that confers nonhost resistance to Empoasca leafhoppers through high-throughput multi-omics analyses.

来源: Trends in Plant Science 期刊

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4. Green Leaf Volatiles-The Forefront of Plant Responses Against Biotic Attack (绿叶挥发物——植物应对生物攻击反应的前沿)

简介: Green leaf volatiles (GLVs) are six-carbon volatile oxylipins ubiquitous in vascular plants. GLVs are produced from acyl groups in the biological membranes via oxygenation by a pathway-specific lipoxygenase (LOX) and a subsequent cleavage reaction by hydroperoxide lyase. Because of the universal distribution and ability to form GLVs, they have been anticipated to play a common role in vascular plants. While resting levels in intact plant tissues are low, GLVs are immediately synthesized de novo in response to stresses, such as insect herbivory, that disrupt the cell structure. This rapid GLV burst is one of the fastest responses of plants to cell-damaging stresses; therefore, GLVs are the first plant-derived compounds encountered by organisms that interact with plants irrespective of whether the interaction is competitive or friendly. GLVs should therefore be considered important mediators between plants and organisms that interact with them. GLVs can have direct effects by deterring herbivores and pathogens as well as indirect effects by attracting predators of herbivores, while other plants can recruit them to prepare their defenses in a process called priming. While the beneficial effects provided to plants by GLVs are often less dramatic and even complementary, the buildup of these tiny effects due to the multiple functions of GLVs can amass to levels that become substantially beneficial to plants. This review summarizes the current understanding of the spatiotemporal resolution of GLV biosynthesis and GLV functions and outlines how GLVs support the basic health of plants.

来源: Plant and Cell Physiology 期刊

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➤ 相关专利

1. Vaccine-like plant immunity inducers (疫苗样植物免疫诱导剂)

简介: Task : Provision of novel compounds useful as vaccine-like plant immune inducers, vaccine-like plant immune inducers using the compounds as active ingredients, and plant disease control methods using the compounds.

SOLUTION : A compound that is a cyclic peptide consisting of an amino acid sequence represented by the following formula (1), in which the amino-terminal α -amino group of the amino acid sequence and the carboxyl group at the carboxyl terminal are linked by a peptide bond. Ser—Gly—Pro—Xaa1—Xaa2—Xaa3—Gln (1)(In formula (1), Xaa1 represents Ser or Thr, Xaa2 represents Arg, Thr, Trp, Cys or Asn, and Xaa3 represents Gln, Ser, Trp, Asn, Ile, Asp or Leu.

来源: 日本专利

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2. REAL TIME DETECTION AND QUANTITATION OF PLANT INNATE IMMUNITY RESPONSE USING RAMAN SPECTROSCOPY (利用拉曼光谱技术实时检测和定量植物先天免疫反应)

简介: 本发明涉及利用拉曼光谱实时检测和定量植物的先天免疫反应。更具体地说, 提供了拉曼光谱作为快速、无创、早期检测和定量植物先天免疫反应的工具。

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