



2023年第45期 总406期

## 茶学研究专题

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1. 利用回收挥发性化合物和相应植物使至少一种酒精液体熟化的方法

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1. 干扰生态学

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2023年11月06日

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## 学术文献

### 1. Molecular basis of methyl-salicylate-mediated plant airborne defence (甲基水杨酸介导的植物空气防御的分子基础)

简介: Aphids transmit viruses and are destructive crop pests<sup>1</sup>. Plants that have been attacked by aphids release volatile compounds to elicit airborne defence (AD) in neighbouring plants. However, the mechanism underlying AD is unclear. Here we reveal that methyl-salicylate (MeSA), salicylic acid-binding protein-2 (SABP2), the transcription factor NAC2 and salicylic acid-carboxymethyltransferase-1 (SAMT1) form a signalling circuit to mediate AD against aphids and viruses. Airborne MeSA is perceived and converted into salicylic acid by SABP2 in neighbouring plants. Salicylic acid then causes a signal transduction cascade to activate the NAC2SAMT1 module for MeSA biosynthesis to induce plant anti-aphid immunity and reduce virus transmission. To counteract this, some aphid-transmitted viruses encode helicase-containing proteins to suppress AD by interacting with NAC2 to subcellularly relocalize and destabilize NAC2. As a consequence, plants become less repellent to aphids, and more suitable for aphid survival, infestation and viral transmission. Our findings uncover the mechanistic basis of AD and an aphidvirus co-evolutionary mutualism, demonstrating AD as a potential bioinspired strategy to control aphids and viruses.

来源: Nature 期刊

发布日期: 2023-09-13

全文链接: <http://agri.nais.net.cn/file1/M00/03/60/Csgk0YmbEMqAQabMBNrun5w0td0318.pdf>

### 2. Plant Allelopathy in Response to Biotic and Abiotic Factors (植物化感作用对生物和非生物因子的响应)

简介: The allelopathy definition accepted by the International Allelopathy Society is any process or phenomenon via which organisms such as plants, microorganism, viruses, and fungi release specific metabolites, known as allelochemicals, into the environment that affect the growth and development of other surrounding plants, resulting in mutual inhibition or promotion of the organisms. Allelopathy in donor plants is either self-induced or induced by specific external biotic and abiotic factors. The external factors may determine the types and quantities of allelochemicals released into the environment by a donor plants. Biotic factors inducing allelopathy include plant competition, herbivory by animals and insects, and soil-borne pathogens. For example, competing plants produce allelochemicals in response to competing weeds. Plants may emit signaling chemicals from their roots to induce the production of protective metabolites against organisms, herbivores, or competitors. Additionally, herbivory is a selection pressure that triggers defensive measures in plants, such as the synthesis of allelochemicals in response to injury. Moreover, some leaves release volatile substances that help the plant to deter or attract herbivores or pests that attack leaves. Likewise, root compounds may be produced in response to soil-borne pathogens. Furthermore, some abiotic factors, including light, temperature, drought, CO<sub>2</sub>, and nutrient deficiency, can also induce plants to release allelochemicals. Therefore, it is pertinent to understand this natural phenomenon in plants and how external factors lead plants to exert allelopathy to compete, defend themselves, and survive in a challenging environment.

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来源: Agronomy-Basel 期刊

发布日期:2023-09-11

全文链接:[http://agri.nais.net.cn/file1/M00/10/32/Csgk0GVEXuGAWaHeAAvGMIs\\_rNI921.pdf](http://agri.nais.net.cn/file1/M00/10/32/Csgk0GVEXuGAWaHeAAvGMIs_rNI921.pdf)

### **3. Plant viruses induce plant volatiles that are detected by aphid parasitoids (植物病毒诱导被蚜虫寄生蜂觉察到的植物挥发物)**

简介: Aphis gossypii (Sternorrhyncha: Aphididae) aphids are vectors of important plant viruses among which cucumber mosaic virus (CMV) and potato virus Y (PVY). Virus-infected plants attract aphid vectors and affect their behavior and growth performance either positively or negatively depending on mode of transmission. Viruses cause changes in the composition and the amount of volatile organic compounds (VOCs) released by the plant that attract aphids. The aphid parasitoid Aphidius colemani (Hymenoptera: Aphelinidae) has been shown to have higher parasitism and survival rates on aphids fed on virus-infected than aphids fed on non-infected plants. We hypothesized that parasitoids distinguish virus-infected plants and are attracted to them regardless of the presence of their aphid hosts. Herein, we examined the attraction of the A. colemani parasitoid to infected pepper plants with each of CMV or PVY without the presence of aphids. The dynamic headspace technique was used to collect VOCs from non-infected and CMV or PVY-infected pepper plants. Identification was performed with gas chromatography-mass spectrometry (GCMS). The response of the parasitoids on virus-infected vs non-infected pepper plants was tested by Y-tube olfactometer assays. The results revealed that parasitoids displayed a preference to CMV and PVY infected plants compared to those that were not infected.

来源: Scientific Reports 期刊

发布日期:2023-05-30

全文链接:[http://agri.nais.net.cn/file1/M00/03/60/Csgk0YmbFxeAO5W8ABfr4sXEj\\_Y692.pdf](http://agri.nais.net.cn/file1/M00/03/60/Csgk0YmbFxeAO5W8ABfr4sXEj_Y692.pdf)

### **4. The Role of Herbivore-induced Plant Volatiles in Trophic Interactions: The Swiss Connection (食草动物诱导的植物挥发物在营养相互作用中的地位: 瑞士的联系)**

简介: It is increasingly evident that plants actively respond to the threats and challenges that they come to face while growing. This is particularly manifested in the dynamic responses to insect herbivory, especially in terms of the volatile compounds that the attacked plants emit. Indeed, many plants respond to insect-inflicted damage with the synthesis and release of volatile organic compounds. These emissions, commonly referred to as herbivore-induced plant volatiles (HIPVs), play important roles in the interactions between the emitting plants and their biotic environment. The odorous signal can be picked up and exploited by various organisms: neighbouring plants, herbivores and their natural enemies, such as predators and parasitoid wasps. Coincidence or not, scientists currently working in Switzerland have made numerous key contributions to the work in this field. By highlighting their work, we attempt to give a somewhat historic overview of this field of research.

来源: Chimia 期刊

发布日期:2022-11-10

全文链接:<http://agri.nais.net.cn/file1/M00/10/32/Csgk0GVEVoCAEALSAAgRA03eXUQ287.pdf>

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## ➤ 相关专利

### 1. Process for maturing at least one alcoholic liquid with recovery of volatile compounds and corresponding plant (利用回收挥发性化合物和相应植物使至少一种酒精液体熟化的方法)

简介: The invention relates to a process for maturing at least one alcoholic liquid (5) including the following steps: 1 using an airtight or semi-airtight chamber (15) located in a wine cellar, and containing at least one container (24) that contains an alcoholic liquid, the container being at least partly made from wood or containing wood, and an internal atmosphere (17) including oxygen; 2 maturing the alcoholic liquid in the container, the maturation releasing volatile compounds into the internal atmosphere; 3 extracting a portion of the internal atmosphere from the chamber in order to obtain a gaseous mixture (32) to be treated; 4 separating the gaseous mixture to be treated into at least a residual gaseous mixture (34) depleted in said volatile compounds, and at least one recovered liquid (36) containing at least some of the volatile compounds; 5 evacuating at least a portion of the residual gaseous mixture to the outside of the chamber, and allowing air into the chamber by forced convection. the recovered liquid being intended to form an alcoholic beverage or an ingredient of a composition, in particular an alcoholic beverage or a perfume.

来源: 美国专利

发布日期: 2019-02-14

全文链接: <http://agri.nais.net.cn/file1/M00/10/32/Csgk0GVElniARkc1ABBiHG7WPUE094.pdf>

## ➤ 科技图书

### 1. Disturbance Ecology (干扰生态学)

简介: 干扰是植被动态的驱动因素, 但植物对气候变化也很敏感, 对生态系统管理提出了挑战。读者将发现扰动机制的全球分布, 并了解干扰对生物多样性和动植物生命进化的重要性。本书提供了一个关于干扰生态学的中欧视角, 并在专门的章节中阐述了重要的扰动因子, 如: 火灾、风、雪崩、树木疾病、昆虫落叶虫、树皮甲虫和大型草食动物。它还包括关于森林和草原的人为干扰的章节。并讨论了气候变化对干扰机制的影响以及解决生态系统管理中干扰风险的方法。在18章第14个文本框中突出了当前干扰生态学的主题, 并提供了该领域更深入的方法论见解。

来源: SpringerLink 网站

发布日期: 2023-12-04

全文链接: <http://agri.nais.net.cn/file1/M00/03/60/Csgk0YmbWYqAGndoAZcDfcYqrDM697.pdf>