2024年第7期 总420期

茶学研究专题

本期导读

学术文献

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相关专利

1. 昆虫信息素的生产方法
2. 昆虫信息素及其前体的生物合成

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学术文献

1．A meta-analytic investigation of the potential for plant volatiles and sex pheromones to enhance detection and management of Lepidopteran pests（植物挥发物和性信息素增强鳞翅目害虫检测和管理潜力的荟萃分析）

简介：Effective early detection, monitoring and management methods are critical for reducing the impacts of insect pests in agriculture and forestry. Combining host plant volatiles with sex pheromones could enhance trapping methodologies, whilst the use of non-host volatiles could improve the effectiveness of pest management through repellency effects. In this meta-analysis approach, we analysed 51 studies that used electroantennograms (EAG), wind tunnels and/or field traps to evaluate the antennal and behavioural responses of Lepidoptera to sex pheromones combined with attractant or repellent plant volatiles. Proposed attractant plant volatiles had a positive association with female Lepidoptera responses to sex pheromone, but effects on males were highly variable, with unexpected repellency reported in some studies. Proposed repellent plant volatiles were significantly or near-significantly negatively associated with male attraction to sex pheromones but were scarcely studied. Sub-group analysis identified that male responses to sex pheromone were reduced when the dose of attractant plant volatile relative to sex pheromone was increased. Green-leaf volatiles were associated with the strongest positive effects for males in field traps. Multiple-compound attractant plant volatile blends were less effective than single compounds in field studies. Our analysis demonstrates, (i) the potential value of combining host plant volatiles with sex pheromones to capture females rather than only males, (ii) the importance of identifying appropriate host plant volatiles and optimal relative doses, and (iii) the potential for non-host plant volatile use in pest management strategies.

来源：Bulletin of Entomological Research 期刊

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全文链接:http://agri.nais.net.cn/file1/M00/10/37/Csgk0EFhof2AYQy2AAU3aN035lo517.pdf

2．*Pseudomonas fluorescens* MFE01 uses 1-undecene as aerial communication molecule（荧光假单胞菌MFE01利用1-undecene作为空气中通讯分子）

简介：The *Pseudomonas fluorescens* MFE01 strain has a very active type six secretion system that can kill some competitive bacteria. Furthermore, MFE01 emits numerous volatile organic compounds, including 1-undecene, which contributes to the aerial inhibition of *Legionella pneumophila* growth. Finally, MFE01 appears to be deprived of *N*-acyl homoserine lactone synthase. The main objective of this study was to explore the role of 1-undecene in the communication of MFE01. We constructed a mutant affected in *undA* gene encoding the enzyme responsible for 1-undecene synthesis to provide further insight into the role of 1-undecene in MFE01. First, we studied the impacts of this mutation both on volatile organic compounds emission, using headspace solid-phase microextraction combined with gas chromatography-mass spectrometry and on *L. pneumophila* long-range inhibition. Then, we analyzed influence of

1-undecene on MFE01 coordinated phenotypes, including type six secretion system activity and biofilm formation. Next, to test the ability of MFE01 to synthesize *N*-acyl homoserine lactones in our conditions, we investigated *in silico* the presence of corresponding genes across the MFE01 genome and we exposed its biofilms to an *N*-acyl homoserine lactone-degrading enzyme. Finally, we examined the effects of 1-undecene emission on MFE01 biofilm maturation and aerial communication using an original experimental set-up. This study demonstrated that the Δ*undA* mutant is impaired in biofilm maturation. An exposure of the Δ*undA* mutant to the volatile compounds emitted by MFE01 during the biofilm development restored the biofilm maturation process. These findings indicate that *P. fluorescens* MFE01 uses 1-undecene emission for aerial communication, reporting for the first time this volatile organic compound as bacterial intraspecific communication signal.

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3．Life History Traits of the Pentatomidae (Hemiptera) for the Development of Pest Management Tools（蝽科（半翅目）生活史特征用于害虫防治工具的研发）

简介：Knowledge of the biology of a pest is essential for building sustainable management programmes. Pentatomidae have a hemimetabolous life cycle with egg, nymphal, and adult life stages, which differ in morphological, ecological, and behavioural traits. Some of these traits, such as mating behaviour, pheromones (alarm and aggregation pheromones) and the acquisition of gut symbionts can be targeted for pest management strategies. Here, we review the available literature on these life history traits of the Pentatomidae with potential for use in management programmes. Pheromone-mediated aggregation and the disruption of symbiont acquisition are two important targets for Pentatomidae control. Other traits such as the use of alarm pheromones for enhancing natural enemies and substrate-borne vibration for mating disruption deserve further consideration. Colour vision and flight ability are still poorly studied, despite their potential importance for stink bug management.

来源：Forests 期刊

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全文链接:http://agri.nais.net.cn/file1/M00/10/37/Csgk0EFhsvyASDg8AB-XZxrp8kw852.pdf

4．Functional incorporation of the insect odorant receptor coreceptor in tethered lipid bilayer nanoarchitectures（昆虫气味受体辅助受体在拴系脂质双层膜纳米结构中的功能整合）

简介：Membrane proteins are among the most important drug targets. To improve drug design, it is critical to study membrane proteins. However, due to the myriad roles fulfilled by the cellular membrane, it is a highly complex environment and challenging to study. Tethered membranes reproduce the basic physicochemical properties of the cellular membrane without its inherent complexity. The high electrical resistance and stability makes them ideal to study membrane

proteins, particularly ion channels. However, due to the close proximity of the membrane to the support and the reduced fluidity and high packing density, they are unsuitable to study larger membrane proteins. We present here a tethered membrane system which adresses these challenges, allowing the functional reconstitution of the odorant receptor coreceptor from Drosophila melanogaster, a tetrameric ionotropic receptor was incorporated and its sensitivity to various ligands was examined via electrochemical impedance spectroscopy and atomic force microscopy.
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相关专利

1. Methods of Producing Insect Pheromones（昆虫信息素的生产方法）

简介：The present disclosure relates to methods of producing insect pheromone precursors and genetically modified plants capable of producing insect pheromone precursors. The genetically modified plants include a heterologous gene encoding at least one silencing suppressor protein and at least one enzyme selected from the group consisting of a fatty acyl desaturase, a fatty acyl elongase, a fatty acyl reductase, and an acyl-CoA oxidase.
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2 . BIOSYNTHESIS OF INSECT PHEROMONES AND PRECURSORS THEREOF（昆虫信息素及其前体的生物合成）

简介：本专利涉及微生物的代谢工程，以提供用于在可扩展且生态友好的发酵反应中产生昆虫信息素及其前体的生物合成方法；例如，通过利用外源代谢机制转化饱和或不饱和底物原料。
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