



2024年第12期 总425期

茶学研究专题

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► 学术文献

1. Roles of insect odorant binding proteins in communication and xenobiotic adaptation (昆虫气味结合蛋白在交流和异种生物适应中的作用)

简介: Odorant binding proteins (OBPs) are small water-soluble proteins mainly associated with olfaction, facilitating the transport of odorant molecules to their relevant receptors in the sensillum lymph. While traditionally considered essential for olfaction, recent research has revealed that OBPs are engaged in a diverse range of physiological functions in modulating chemical communication and defense. Over the past 10 years, emerging evidence suggests that OBPs play vital roles in purifying the perireceptor space from unwanted xenobiotics including plant volatiles and pesticides, potentially facilitating xenobiotic adaptation, such as host location, adaptation, and pesticide resistance. This multifunctionality can be attributed, in part, to their structural variability and effectiveness in transporting, sequestering, and concealing numerous hydrophobic molecules. Here, we firstly overviewed the classification and structural properties of OBPs in diverse insect orders. Subsequently, we discussed the myriad of functional roles of insect OBPs in communication and their adaptation to xenobiotics. By synthesizing the current knowledge in this field, our review paper contributes to a comprehensive understanding of the significance of insect OBPs in chemical ecology, xenobiotic adaptation, paving the way for future research in this fascinating area of study.

来源: Frontiers in Insect Science 期刊

发布日期: 2023-10-06

全文链接: <http://agri.nais.net.cn/file1/M00/03/6B/Csgk0WXwED-AWQirACfRPmeQeac318.pdf>

2. Chemical communication between plants and insects (植物与昆虫之间的化学通讯)

简介: The chemical communication between plants and insects plays a pivotal role in shaping plant-insect interactions and ecological networks, making it a vital component in both natural and agricultural ecosystems. Despite the considerable advancements in the field of chemical ecology, numerous challenges remain due to its interdisciplinary nature (encompassing evolutionary biology, neurobiology, chemistry, animal behavior, and network ecology), as well as the complexity of chemical communication (including mediating mutualistic and antagonistic relationships, and multifunctional roles at the community level). In this special issue of the Journal of Systematics and Evolution, we present a collection of 10 papers addressing these challenges through original research and comprehensive reviews of relevant subfields. The contributions can be organized into four primary themes: (i) community-level communication theory and its application to plant-pollinator communities; (ii) the evolutionary history of communication from a phylogenetic and macroevolutionary perspective; (iii) various communication types, including plant-pollinator, plant-pest, and plant-fungi-insect interactions; and (iv) an exploration of different communication factors such as distyly, odor dynamics, chemical structures, and the impact of herbicides.

来源: Journal of Systematics and Evolution 期刊

发布日期: 2023-05-19

全文链接: <http://agri.nais.net.cn/file1/M00/10/3E/Csgk0EGZZ1CANFCcAAH6t6o5ltc360.pdf>

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3. Ozone exposure disrupts insect sexual communication (臭氧暴露破坏昆虫的性交流)

简介: Insect sexual communication often relies upon sex pheromones. Most insect pheromones, however, contain carbon-carbon double bonds and potentially degrade by oxidation. Here, we show that frequently reported increased levels of Anthropogenic ozone can oxidize all described male-specific pheromones of *Drosophila melanogaster*, resulting in reduced amounts of pheromones such as cis-Vaccenyl Acetate and (Z)-7-Tricosene. At the same time female acceptance of ozone-exposed males is significantly delayed. Interestingly, groups of ozone-exposed males also exhibit significantly increased levels of male-male courtship behaviour. When repeating similar experiments with nine other drosophilid species, we observe pheromone degradation and/or disrupted sex recognition in eight of them. Our data suggest that Anthropogenic levels of ozone can extensively oxidize double bonds in a variety of insect pheromones, thereby leading to deviations in sexual recognition.

来源: Nature Communications 期刊

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全文链接:<http://agri.nais.net.cn/file1/M00/03/6B/Csgk0WXwFy6AlmytAC914TMFkk8984.pdf>

4. Sound production and hearing in insects (昆虫的声音产生和听觉)

简介: Among the oldest land animals, insects have roamed the planet for over 400 million years. Acoustics plays a vital role in the ecology of many insects across the globe, facilitating mate finding, defence and information transfer. Many insect sounds are readily perceived by human ears, with the sound of singing cicadas or grasshoppers familiar to many. Yet how insects produce sounds, and what they use them for is not always evident, and they might not even be perceptible to human ears. The Belgian painter Erik Pevernagie encouraged acoustic awareness: 'Let us drop our tin ear and listen to the sounds of the real world veiled beyond our inattention'. His appeal can be elegantly applied to insect bioacoustics, as while singing cicadas epitomise the searing heat of a southern summer to most, there is a vast hidden world of insect sounds, which is both wondrous and complex. Generations of scientists have tasked themselves with uncovering its secrets, with new chapters written still today. Here we will explore and summarise the many fascinating ways insects both produce and perceive sounds, as well as look into how they exploit sound to their benefit in an ecological context. We look to bring together both classic and modern research, while looking to the future to speculate on what the next steps in understanding the acoustic world of insects might be.

来源: Advances in Insect Physiology 期刊

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全文链接:<http://agri.nais.net.cn/file1/M00/10/3E/Csgk0EGZY1-AND8vAC75vWk6p3c548.pdf>

➤ 相关专利

1. Iot-based pheromone trap system and method for real-time monitoring

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of insect population (基于Iot的信息素捕获系统及昆虫种群实时监测方法)

简介: The present disclosure proposes an IoT-based pheromone trap system (100) for real-time monitoring of insect population. The IoT-based pheromone trap system (100) comprises a trap roof unit (102), a trap funnel unit (118) and a trap collection unit (124). The pheromone trap system (100) that provides the farmers with real-time warnings and data which, allows for rapid intervention and decision-making regarding pest management. The pheromone trap system (100) is also useful in developing effective pest control tactics, data analysis comprises pest identification, population monitoring, and predictive modelling.

来源: 印度专利

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全文链接:<http://agri.nais.net.cn/file1/M00/03/6B/Csgk0WXxGpiALqTDAB43rlZla9Y915.pdf>

➤ 科技图书

1. Jervis's Insects as Natural Enemies: Practical Perspectives (杰维斯的天敌昆虫：实践视角)

简介: 在过去的几十年里，对昆虫天敌的理论和实践研究急剧增加。昆虫捕食者，特别是寄生蜂作为研究动物的吸引力源于许多物种在实验室中相对容易培养和实验，大多数寄生蜂物种的生命周期简单，以及对虫害生物防治的日益增长的需求，是虫害综合管理方法的一个关键组成部分。现在有大量关于昆虫天敌的文献，因此非常需要一份通用的文本，以便学生或研究人员在决定适合研究和评估这些昆虫的方法和技术时使用。本书满足了这种需求，并且提供了捕食者和拟寄生物生物学的主要方面的说明，穿插了关于进行哪些实验或观察的信息和建议，更重要的是，如何进行这些实验或观察。必要时，对可能需要参考的有关特定主题提供了最新的参考文献。杰维斯的《天敌昆虫》在强调实用性方面是独一无二的。它面向在大学、政府和商业机构从事虫害综合管理、农业、园艺和林业领域工作的学生和专业人员，以及对人口、社会和进化生态学感兴趣的人群。

来源: SpringerLink 网站

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