2024年第16期 总429期

茶学研究专题

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科技图书

1. 昆虫时间生物学

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学术文献

1. The ecology of nutrient sensation and perception in insects（昆虫营养感觉和知觉的生态学）

简介：Insects are equipped with neurological, physiological, and behavioral tools to locate potential food sources and assess their nutritional quality based on volatile and chemotactile cues. We summarize current knowledge on insect taste perception and the different modalities of reception and perception. We suggest that the neurophysiological mechanisms of reception and perception are closely linked to the species-specific ecology of different insects. Understanding these links consequently requires a multidisciplinary approach. We also highlight existing knowledge gaps, especially in terms of the exact ligands of receptors, and provide evidence for a perceptional hierarchy suggesting that insects have adapted their reception and perception to preferentially perceive nutrient stimuli that are important for their fitness.

来源：Trends in Ecology & Evolution 期刊

发布日期:2023-10-20

全文链接:http://agri.nais.net.cn/file1/M00/03/6C/Csgk0WYChuSAa-g5ABCffOUO_3A607.pdf

2. Deciphering Plant-Insect-Microorganism Signals for Sustainable Crop Production（解读植物-昆虫-微生物信号以促进作物可持续生产）

简介：Agricultural crop productivity relies on the application of chemical pesticides to reduce pest and pathogen damage. However, chemical pesticides also pose a range of ecological, environmental and economic penalties. This includes the development of pesticide resistance by insect pests and pathogens, rendering pesticides less effective. Alternative sustainable crop protection tools should therefore be considered. Semiochemicals are signalling molecules produced by organisms, including plants, microbes, and animals, which cause behavioural or developmental changes in receiving organisms. Manipulating semiochemicals could provide a more sustainable approach to the management of insect pests and pathogens across crops. Here, we review the role of semiochemicals in the interaction between plants, insects and microbes, including examples of how they have been applied to agricultural systems. We highlight future research priorities to be considered for semiochemicals to be credible alternatives to the application of chemical pesticides.

来源：Biomolecules 期刊

发布日期:2023-06-15

全文链接:http://agri.nais.net.cn/file1/M00/10/3F/Csgk0EGr4xWAMoWMACksc42zWAQ392.pdf

3. Insect olfactory system inspired biosensors for odorant detection（昆虫嗅觉系统启发的气味检测生物传感器）

简介：With their accurate olfactory system, insects can detect and discriminate thousands of odorants at very low concentrations in a complicated chemical environment. Inspired by this remarkable olfactory ability, physicochemical transducers integrated with different olfactory derived materials or biomimetic elements were studied and developed, which are collectively called olfactory biosensors. Widely used biological materials include insect antennae, odorant-binding proteins, chemosensory

proteins, olfactory receptors, and even sensitive peptides. Based on the physiological properties of these biological materials, they can be incorporated with different analytical techniques, including electrochemical impedance spectroscopy, localized surface plasmon resonance, field-effect transistors, quartz crystal microbalance, surface acoustic waves, and fluorescence imaging, for odorant detection. This paper reviews the development of olfactory biosensors along with typical biochemical detecting cases. The roles of the olfactory system are highlighted to show the design, construction, and detection of olfactory biosensors. Meanwhile, the performance and advantages of insect olfactory system inspired biosensors are introduced with their applications in food evaluation, environmental monitoring, and healthcare diagnosis. With advances in olfactory sensing mechanisms, sensing technologies, and miniaturized electronics, olfactory biosensors, especially those biosensors based on olfactory sensing systems, will eventually become effective detection and analytical tools in the future.

来源： Sensors & Diagnostics 期刊

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全文链接: http://agri.nais.net.cn/file1/M00/03/6C/Csgk0WYCilKAUI5iAEDQTpgHPKQ141.pdf

4. Phytopathogens Increase the Preference of Insect Vectors to Volatiles Emitted by Healthy Host Plants（植物病原体增加昆虫介体对健康寄主植物释放挥发物的偏好）

简介： Phytopathogen infections not only affect the physiology of host plants but also the preference of insect vectors; these modifications may increase the spread of infection. For this, we determined the effects of "*Candidatus* Liberibacter asiaticus" (CLas) infection on the preference of an insect vector (*Diaphorina citri*) for its uninfected or CLas-infected host (*Citrus sinensis*) and found that the infected vector preferred uninfected citrus, while the uninfected vector preferred infected citrus. We identified two compounds, (*Z*)-3 hexenyl and methyl salicylate, that were differentially abundant in the volatiles emitted by infected and uninfected citrus and two odorant-binding protein (OBP) genes differentially expressed between infected and uninfected vectors. The results of receptor-ligand binding assays indicated that CLas upregulated OBP A10 expression in the infected vector to target (*Z*)-3 hexenyl acetate emitted by uninfected citrus and induced citrus to emit more methyl salicylate for binding to OBP2 in the uninfected vector. Our results might be useful for the effective control of CLas infections.

来源： Journal of Agricultural and Food Chemistry 期刊

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相关专利

1. METHOD FOR CONTROLLING BEHAVIOR OF INSECT VIA TASTE PERCEPTION（通过味觉控制昆虫行为的方法）

简介： 本发明目的是通过提供一种草食行为被抑制的杂食性昆虫来解决使用生物农药的杂食性昆虫对作物本身造成损害的问题，所述杂食性昆虫的特征在于与草食行为相关的味觉感知基因

的缺失或抑制表达。
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科技图书

1．Insect Chronobiology（昆虫时间生物学）

简介：This book reviews the physiological mechanisms of diverse insect clocks, including circadian clock, lunar clock, tidal clock, photoperiodism, circannual rhythms and others. It explains the commonality and diversity of insect clocks, focusing on the recent advances in their molecular and neural mechanisms. In the history of chronobiology, insects provided important examples of diverse clocks. The first report of animal photoperiodism was in an aphid, and the time-compensated celestial navigation was first shown in the honeybee. The circadian clock was first localized in the brain of a cockroach. These diverse insect clocks also have some common features which deserve to be reviewed in a single book. The central molecular mechanism of the circadian clock, i.e., the negative feedback loop of clock genes, was proposed in Drosophila melanogaster in the 1990s and later became the subject of the Nobel Prize in Physiology or Medicine in 2017. Thereafter, researches on the molecular and neural mechanisms in diverse insect clocks other than the Drosophila circadian clock also advanced appreciably. Various new methods including RNAi, NGS, and genome editing with CRISPR-Cas9 have become applicable in these researches. This book comprehensively reviews the physiological mechanisms in diverse insect clocks in the last two decades, which have received less attention than the Drosophila circadian clock. The book is intended for researchers, graduate students, and highly motivated undergraduate students in biological sciences, especially in entomology and chronobiology.
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