



2023年第47期 总408期

茶学研究专题

本期导读

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3. 不同蛾类(Geometridae: Boarmiini)的分子系统发育、分类、生物地理及多样化模式
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1. 害虫管理的微生物方法

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► 学术文献

1. Integrated Pest Management (IPM) in Agriculture and Its Role in Maintaining Ecological Balance and Biodiversity (农业有害生物综合治理及其在维持生态平衡和生物多样性中的作用)

简介: The production of sustainable crops and environmental management in farming face several significant potential obstacles, including climate change, resource depletion and environmental degradation. Weeds and insect pests that considerably reduce yields have put crop production systems in danger. The greatest worry for farmers is the decline in productivity due to illnesses and pests. Insects, weed pests, and plant pathogens destroy more than 40% of all potential food production every year. The widespread use of integrated pest management (IPM) is a result of worries about the long-term viability of conventional agriculture. IPM ensures sufficient, secure, equitable, and steady flows of both food and ecosystem services, as well as increased agricultural profitability due to lower pest management expenditures. A number of studies conducted on IPM have been combined. Important information from all these studies was analyzed and summarized in this literature review. In this article, we investigated the following: (1) explanation of different management components; (2) development in organically integrated weed and insect pest management, with possible ramifications and scope; (3) knowledge and adaptation status of IPM in the modern world; (4) resources and tools of IPM; (5) current challenges and suggested future research priorities. Regular training related to IPM should be arranged to spread the knowledge of IPM to all farmer levels. This requires the cooperation of the government. Furthermore, IPM will reach a new milestone if Internet of Things technology is practiced along with the existing pest control method. Overall, this review addresses the possibilities for researchers and farmers to use a variety of natural control agents as a full or partial replacement for synthetic pesticides.

来源: Advances in Agriculture 期刊

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全文链接: <http://agri.nais.net.cn/file1/M00/10/33/Csgk0GVJ6yWAV6f3AAp6PF7AmXQ466.pdf>

2. Light induces an increasing release of benzyl nitrile against diurnal herbivore *Ectropis grisescens* Warren attack in tea (*Camellia sinensis*) plants (光诱导苯乙腈的释放增加, 以对抗茶树上日食性草食昆虫灰茶尺蠖的攻击)

简介: Herbivore-induced plant volatiles (HIPVs) are critical compounds that directly or indirectly regulate the tritrophic interactions among herbivores, natural enemies and plants. The synthesis and release of HIPVs are regulated by many biotic and abiotic factors. However, the mechanism by which multiple factors synergistically affect HIPVs release remains unclear. Tea plant (*Camellia sinensis*) is the object of this study because of its rich and varied volatile metabolites. In this study, benzyl nitrile was released from herbivore-attacked tea plants more in the daytime than at night, which was consistent with the feeding behaviour of tea geometrid (*Ectropis grisescens* Warren) larvae. The Y-tube olfactometer assay and insect resistance analysis revealed that benzyl nitrile can repel tea geometrid larvae and inhibit their growth. On the basis of enzyme activities in transiently

transformed *Nicotiana benthamiana* plants, *CsCYP79* was identified as a crucial regulator in the benzyl nitrile biosynthetic pathway. Light signalling-related transcription factor *CsPIF1*-like and the jasmonic acid (JA) signalling-related transcription factor *CsMYC2* serve as the activator of *CsCYP79* under light and damage conditions. Our study revealed that light (abiotic factor) and herbivore-induced damage (biotic stress) synergistically regulate the synthesis and release of benzyl nitrile to protect plants from diurnal herbivorous tea geometrid larvae.

来源: Plant Cell & Environment 期刊

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3. Molecular phylogeny, classification, biogeography and diversification patterns of a diverse group of moths (Geometridae: Boarmiini) (不同蛾类 (Geometridae: Boarmiini) 的分子系统发育、分类、生物地理及多样化模式)

简介: We investigated diversification patterns and historical biogeography of a hyperdiverse lineage of Lepidoptera, the geometrid moths, by studying its most species-rich tribe Boarmiini, which comprises ca. 200 genera and ca. known 3000 species. We inferred the evolutionary relationships of Boarmiini based on a dataset of 346 taxa, with up to eight genetic markers under a maximum likelihood approach. The monophyly of Boarmiini is strongly supported. However, the phylogenetic position of many taxa does not agree with current taxonomy, although the monophyly of most major genera within the tribe is supported after minor adjustments. Three genera are synonymized, one new combination is proposed, and four species are placed in *incertae sedis* within Boarmiini. Our results support the idea of a rapid initial diversification of Boarmiini, which also implies that no major taxonomic subdivisions of the group can currently be proposed. A time-calibrated tree and biogeographical analyses suggest that boarmiines appeared in Laurasia ca. 52 Mya, followed by dispersal events throughout the Australasian, African and Neotropical regions. Most of the transcontinental dispersal events occurred in the Eocene, a period of intense geological activity and rapid climate change. Diversification analyses showed a relatively constant diversification rate for all Boarmiini, except in one clade containing the species-rich genus *Cleora*. The present work represents a substantial contribution towards understanding the evolutionary origin of Boarmiini moths. Our results, inevitably biased by taxon sampling, highlight the difficulties with working on species-rich groups that have not received much attention outside of Europe. Specifically, poor knowledge of the natural history of geometrids (particularly in tropical clades) limits our ability to identify key innovations underlying the diversification of boarmiines.

来源: Molecular Phylogenetics and Evolution 期刊

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全文链接:<http://agri.nais.net.cn/file1/M00/10/33/Csgk0GVJ4UeAcc11AD4wbui6-qc273.pdf>

4. Choice and No-Choice Bioassays to Study the Pupation Preference and Emergence Success of *Ectropis grisescens* (选择与非选择性生物测定法研究灰茶尺蠖的化蛹偏好与羽化成功率)

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简介: Many insects live above the ground as larvae and adults and as pupate below the ground. Compared to the above-ground stages of their life cycles, less attention has been paid on how environmental factors affect these insects when they pupate within the soil. The tea looper, *Ectropis grisescens* Warren (Lepidoptera: Geometridae), is a severe pest of tea plants and has caused huge economic losses in South China. The protocols described here aim to investigate, through multiple-choice bioassays, whether mature last-instar *E. grisescens* larvae can discriminate soil variables such as the substrate type and moisture content, and determine, through no-choice bioassays, the impact of the substrate type and moisture content on pupation behaviors and the emergence success of *E. grisescens*. The results would enhance the understanding of the pupation ecology of *E. grisescens* and may bring insights into soil-management tactics for suppressing *E. grisescens* populations. In addition, these bioassays can be modified to study the influences of various factors on the pupation behaviors and survivorship of soil-pupating pests.

来源: Journal of Visualized Experiments 期刊

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➤ 相关专利

1. HIGH EFFICIENT SEX PHEROMONE LURES FOR *ECTROPIS OBLIQUE* AND *ECTROPIS GRISESCENS* (高效性信息素引诱剂对茶尺蠖和灰茶尺蠖的引诱作用)

简介: 本发明属于生物防治的研究领域。茶尺蠖和灰茶尺蠖作为茶园中的害虫，特别提供了一种高效的性信息素引诱茶尺蠖和灰茶尺蠖。通过将(3Z, 6Z, 9Z)-十八碳三烯与(3Z, 9Z)-6, 7-环氧-十八碳二烯和(3Z, 6Z)-9, 10-环氧-十八碳二烯的两种不同构型组合，获得了高效性信息素诱饵。这种高效的性信息素引诱剂对茶尺蠖和灰茶尺蠖的诱捕效果显著提高。

来源: 美国专利

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➤ 科技图书

1. Microbial Approaches for Insect Pest Management (害虫管理的微生物方法)

简介: This book brings together specialized information on modern aspects of applied microbiology in pest management. In the last few decades, the humans have witnessed major advancements in Life Sciences, as a result several new and powerful tools and techniques have evolved. This has led to great advancements in microbial nutrition, genetics and their application in different fields. In modern era of biotechnology, the microbes have provided solutions to many of the human problems and necessities and thus serve as human and farmers' friends. The microbes have proved to be successful tools for the pest management. Similarly, there has been much advancement in the field of

molecular biology, where many more techniques have evolved which can be helpful in the field of pest management too. Plant resistance, development of transgenic plants, and many more techniques are being considered the panacea to pest problems. On the other hand, there are wide spread concerns of the safety of these microbial and biotechnological interventions with nontarget organisms including humans. While the world stands divided on the ethical issues of these approaches and the many safety concerns, scientists believe that well thought of microbial and biotechnological interventions are probably the only safest ways possible for reducing pest attacks on crops. This is useful read for postgraduate students and teachers, plant protection practioners across the world and also useful for policy planners.

来源: SpringerLink 网站

发布日期:2022-01-01

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