2023年第41期 总402期

茶学研究专题

本期导读

学术文献

1. 茶小绿叶蝉诱导的互利素吸引卵寄生蜂、缨小蜂以抑制叶蝉
2. 挥发性有机化合物概述
3. 野艾蒿作为诱集植物对茶园绿盲蝽的防治效果评价
4. 茶树对茶小绿叶蝉的防御反应：多组学研究

相关专利

1. 减轻茶小绿叶蝉对茶树危害的制剂及方法
2. 对叶蝉幼虫的处理方法

中国农业科学院农业信息研究所
联系人：王玉芹
联系电话：010-82109896
邮箱：agri@ckcest.cn
2023年10月09日

学术文献

1. Tea green leafhopper-induced synomone attracts the egg parasitoids, mymarids to suppress the leafhopper（茶小绿叶蝉诱导的互利素吸引卵寄生蜂、缨小蜂以抑制叶蝉）

简介：Background： The tea green leafhopper, *Empoasca flavescens* is the most important pest of tea plants in China. Mymarid attractants based on herbivore-induced plant volatiles (HIPVs) from leafhopper feeding and oviposition-induced plant volatiles (OIPVs) were formulated and tested as a novel pest control agent against the leafhopper in tea plantations.

Results： Results showed that two mymarid species, *Stethynium empoascae* and *Schizophragma parvula*, had a reducing effect on leafhopper populations. The HIPVs and OIPVs were identified and bioassayed to screen the key synomones showing strong attraction to the mymarids. They were formulated into different blends, of which Field Attractant 1, comprising linalool, methyl salicylate, (*E*)-2-hexenal, perillen and *α*-farnesene at ratio of 1:2:3:58:146 (20 mg/lure), showed the strongest attraction to the mymarids. In field trials with the attractant, the average parasitism rate (60.46 ± 23.71%) of tea leafhoppers by the two mymarids in the attractant-baited area was significantly higher than that (42.85 ± 19.24%) in the CK area. Also, the average leafhopper density (46 ± 30 per 80 tea shoots) in the attractant-baited area was significantly lower than that (110 ± 70 per 80 tea shoots) in the CK area.

Conclusion： This study showed that a synthetic blend of key volatiles from HIPVs and OIPVs at an optimal ratio can be formulated into an attractant with the potential to attract and retain wild mymarid populations to suppress leafhopper populations in infested tea plantations, so as to reduce or avoid the spraying of insecticides.

来源： Pest Management Science 期刊

发布日期: 2023-06-22

全文链接: http://agri.nais.net.cn/file1/M00/10/31/Csgk0GUVJG6AApgXABio4f7fDSw995.pdf

2. An Overview of Volatile Organic Compounds (VOCs)（挥发性有机化合物概述）

简介： VOCs are volatile organic compounds that are produced naturally as well as due to anthropogenic activities. The application of VOCs ranges from being a biological chemical signal to a metabolic product to a serious pollutant. VOCs are gaining significance in the context of biology, diagnostics, sustainability as well as a healthy lifestyle. In this article, an overview of VOCs, their sources and their applications are discussed.

来源： Resonance – Journal of Science Education 期刊

发布日期: 2022-12-22

全文链接: http://agri.nais.net.cn/file1/M00/03/5F/Csgk0Ylr1TiAbcM-AKhHCLvKWSQ240.pdf

3. Assessing *Artemisia lavandulaefolia* as a trap plant for managing *Apolygus lucorum* in tea plantations（野艾蒿作为诱集植物对茶园绿盲蝽的防治效果评价）

简介：Green plant bugs *Apolygus lucorum* Meyer-Dür (Hemiptera: Miridae) are among the most important piercing-sucking insect pests of the tea plant *Camellia sinensis* (L.) O. Kuntze (Theaceae) and severely reduce the quality and economic benefits of tea. The preference of *A. lucorum* for tea plants and weed hosts, including *Humulus scandens* (Lour.) (Moraceae), *Artemisia lavandulaefolia* DC., *Conyza canadensis* (L.) Cronq, and *Artemisia annua* L. (all Asteraceae), was evaluated using an olfactometer bioassay. Volatiles from weed host plants were analyzed by electronic nose and gas chromatography/mass spectrometry. The *A. lucorum* adults had a significant preference for the volatiles from *A. lavandulaefolia* compared to volatiles from tea. Myrcene, 1,8-cineole, and sabinene were the three dominant components in the *A. lavandulaefolia* flower volatiles. *Artemisia lavandulaefolia* was selected as a trap plant to assess the attractiveness to *A. lucorum* and the effects on natural enemies. The population density of *A. lucorum* on *A. lavandulaefolia* planted in tea plantations was significantly higher than that on tea. In particular, in tea fields with *A. lavandulaefolia* at 2 m spacing, the number of *A. lucorum* on trap strips of *A. lavandulaefolia* was higher than on tea at 10, 20, and 30 m away from the trap strips. The trap strips of *A. lavandulaefolia* also promoted a small increase in the presence of natural enemies in the tea agroecosystem, especially lacewings. Our research indicated that planting *A. lavandulaefolia* as a trap plant at 2 m spacing has the potential to manipulate the population of *A. lucorum* in tea plantations.

来源：Entomologia Experimentalis et Applicata 期刊

发布日期:2022-12-19

全文链接:http://agri.nais.net.cn/file1/M00/10/31/Csgk0GUVN6SAccgJABwIvZnXJbE763.pdf

4. Defensive Responses of Tea Plants (*Camellia sinensis*) Against Tea Green Leafhopper Attack: A Multi-Omics Study（茶树对茶小绿叶蝉的防御反应：多组学研究）

简介：Tea green leafhopper [*Empoasca (Matsumurasca) onukii* Matsuda] is one of the most devastating pests of tea plants (*Camellia sinensis*), greatly impacting tea yield and quality. A thorough understanding of the interactions between the tea green leafhopper and the tea plant would facilitate a better pest management. To gain more insights into the molecular and biochemical mechanisms behind their interactions, a combined analysis of the global transcriptome and metabolome reconfiguration of the tea plant challenged with tea green leafhoppers was performed for the first time, complemented with phytohormone analysis. Non-targeted metabolomics analysis by ultra-performance liquid chromatography quadrupole time-of-flight mass spectrometry (UPLC-QTOF MS), together with quantifications by ultra-performance liquid chromatography triple quadrupole mass spectrometry (UPLC-QqQ MS), revealed a marked accumulation of various flavonoid compounds and glycosidically bound volatiles but a great reduction in the level of amino acids and glutathione upon leaf herbivory. RNA-Seq data analysis showed a clear modulation of processes related to plant defense. Genes pertaining to the biosynthesis of phenylpropanoids and flavonoids, plant-pathogen interactions, and the biosynthesis of cuticle wax were significantly up-regulated. In particular, the transcript level for a CER1 homolog involved in cuticular wax alkane formation was most drastically elevated and an increase in C29 alkane levels in tea leaf waxes was observed. The tea green leafhopper attack triggered a significant increase in salicylic

acid (SA) and a minor increase in jasmonic acid (JA) in infested tea leaves. Moreover, transcription factors (TFs) constitute a large portion of differentially expressed genes, with several TFs families likely involved in SA and JA signaling being significantly induced by tea green leafhopper feeding. This study presents a valuable resource for uncovering insect-induced genes and metabolites, which can potentially be used to enhance insect resistance in tea plants.

来源： Frontiers in Plant Science 期刊

发布日期: 2020-01-17

全文链接: http://agri.nais.net.cn/file1/M00/03/5F/Csgk0Ylr5MCAMvNMAB_u8oQ1v2Q073.pdf

相关专利

1．减轻茶小绿叶蝉对茶树危害的制剂及方法（A preparation and a method for reducing the harm of tea green leafhopper to tea plants)

简介： 本发明公开了一种减轻茶小绿叶蝉对茶树危害的制剂及方法，所述制剂的活性成分为油菜素内酯。本发明通过室内和室外试验发现，对茶树叶面喷施活性成分为油菜素内酯的制剂，可以显著减轻茶小绿叶蝉对茶树叶片和茎节的危害，同时还能促进茶树在茶小绿叶蝉侵害下的生长，可以促进茶树茎节伸长，增加茶树一芽三叶(茶树主要经济价值部位)各部位叶片及茎节的鲜重，从而一定程度弥补了茶小绿叶蝉侵害造成的茶叶产量下降，是一种绿色安全的方法。

来源： 中国专利

发布日期: 2022-07-29

全文链接: http://agri.nais.net.cn/file1/M00/03/5F/Csgk0Ylr8L2AaghXAApwSfYt_Lc436.PDF

2．Treatment procedure against leafhopper larvae（对叶蝉幼虫的处理方法）

简介： Treatment procedure of a plant (2) to prevent the appearance of larvae through the bark (6) of the plant (2), which implements a stage of application of a viscous layer (14) to the surface (12) of the bark (6) of the plant (2), to close at least one gap (10) that crosses the bark (6).

来源： 西班牙专利

发布日期: 2022-02-01

全文链接: http://agri.nais.net.cn/file1/M00/10/31/Csgk0GUVQb-AP_l4AAVxXaKd48I419.pdf