2019年第10期 总163期

茶学研究专题

本期导读

学术文献

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相关专利

1. The detecting device of Insect vibration signal
2. 利用振动防治害虫的方法

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学术文献

1. Biotremology: Do physical constraints limit the propagation of vibrational information?（生物形态学：物理约束是否限制了振动信息的传播？）

简介：Vibrations are a ubiquitous source of information in the environment, and are utilized by a wide range of animals. In this review, I concentrate on the propagation of vibrations across and through substrates, which are materials and surfaces. During the propagation process, physical constraints act on vibrational signals and cues, including loss of energy, filtering or distortion of information. An understanding of these physical mechanisms is important for answering biological questions about communication and information gathering, particularly the reach of signals/cues and how information can be separated from background noise. In this review, I explore the interdisciplinary links central to the field of biotremology to probe the extent to which physical laws limit information propagation. In what follows, I start with a primer in wave theory, before focusing on how the physical factors of wave type and substrate properties affect vibration propagation. I then turn to the interacting biological factors that influence signal/cue propagation during animal-substrate coupling, discussing the numerous behavioural and morphological adaptations employed to mitigate physical constraints. Following this, I then move from limits to possibilities, discussing how animals harness physical laws to provide useful information. Using examples from a wide range of animal systems and biological contexts, I highlight the array of evolutionary strategies to promote the propagation of information given inevitable physical constraints.

来源：Animal Behaviour 期刊

发布日期:2017-07-17

全文链接:http://agri.ckcest.cn/file1/M00/06/5E/Csgk0FxuVAeABUdZAA4FamsVpFo448.pdf

2. Physical Aspects of Vibrational Communication（振动传播在物理方面的研究）

简介：Thirty years ago, we found that insect vibrational songs may travel as bending waves through the stems of various plants. It was already known that other kinds of waves were involved when ants or scorpions detect vibrations through soil or sand, and we anticipated that several other kinds of waves would be involved in different substrates. This review summarizes the progress made since our study and points out some problems that need scrutiny: the energetic costs of communicating through different substrates, how vibrations propagate in plants and soils, discrimination between attenuations due to the substrate and those due to geometric spreading, and whether we can be sure that we record the kinds of waves sensed by the animals.

来源：Studying Vibrational Communication 图书

发布日期:2014-07-26

全文链接:http://agri.ckcest.cn/file1/M00/06/5E/Csgk0FxuUXqAMgwNAAavK8zquPI821.pdf

3．Parasitoid vibrations as potential releasing stimulus of evasive behaviour in a leafminer（寄生昆虫振动是潜蝇逃避行为的一种潜在的释放刺激）

简介：The aim of this study was to characterize the vibratory signals produced by the parasitoid *Sympiesis sericeicornis* Nees (Hymenoptera: Eulophidae) while foraging on apple leaves infested by one of its hosts, the spotted tentiform leafminer *Phyllonorycter malella* (Ger.) (Lepidoptera: Gracillariidae).This leafminer changes its behaviour as a function of the parasitoid's behaviour to escape parasitization.We propose that the leafminer uses vibrations triggered by the parasitoid to detect the presence of its enemy. We measured vibrations produced by a foraging parasitoid on a mine with a laser vibrometer.By recording concurrently the behaviour of the parasitoid on video, vibrations could be assigned to particular behaviours.Subsequently, vibrations were characterized by their dominant frequencies and intensities.The behaviours Landing and Take-off both produced strong impact-like vibrations characterized by an initial irregular phase during which frequencies up to 25 kHz occurred followed by a slow decaying regular phase.Vibrations elicited by Moving, Standing and Probing showed no clear temporal pattern.During Probing, dominant frequencies of up to 5.6 kHz were observed frequently at intensities well above the background noise (>10 dB).During Moving and Standing, vibrations were more scarce and of lower frequencies and intensities. Due to their impact-like nature, vibrations produced by Landing and Take-off are probably not specific to the parasitoid. Vibrations produced by Moving and Standing are difficult to detect and not reliable because of their non-specificity. Therefore, only Probing provides a reliable and detectable source of information for the host.The vibrations elicited during Probingcould account for the evasive behaviour that is observed in this and other leafminers.

来源：Physiological Entomology 期刊

发布日期:1996-05-20

全文链接:http://agri.ckcest.cn/file1/M00/06/5E/Csgk0FxuWGiAPymAABAA2CcZ0A8945.pdf

4．Roles of interplant movement, acoustic communication, and phototaxis in mate-location behavior of the leafhopper Graminella nigrifrons（植物间运动、声音传播和趋光性在叶蝉(*Graminella nigrifrons*)择偶行为中的作用）

简介：Male *Graminella nigrifrons* leafhoppers (Cicadellidae: Homoptera) employ a "call-fly" strategy to find virgin females on oat host plants. Males observed in isolation during daylight hours exhibit a high rate of interplant movement, calling from the lower canopy on each plant visited. Virgin and mated females exhibit little interplant movement. They differ from one another in that virgin females perch on the upper half of plants, whereas mated females perch on the lower half of plants. The positioning of females in the plant canopy is influenced by light. Unlike mated females, virgin females respond to male calls by emitting their own acoustic signals. When virgin females are present on plants visited by males, interplant movement of males ceases, and a localized-upward search of the female bearing plant ensues. Male search is influenced by light. Regardless of whether virgin females were confined to the upper or lower portion of plants, direction of male search was towards a light source used to illuminate above or

below the plant canopy. These findings suggest that interplant movement by males and sedentary behavior by females prior to mate recognition and their use of acoustic and phototactic sensory modalities after mate recognition represent previously unrecognized adaptations to problems associated with the use of vibrational signals on plants.
来源：Behavioral Ecology and Sociobiology 期刊
发布日期:1991-10-20
全文链接:http://agri.ckcest.cn/file1/M00/06/5E/Csgk0Fxs3fKAM3O-AAsFef4O4qM481.pdf

相关专利

1．一种昆虫振动信号的检测装置 (The detecting device of Insect vibration signal)

简介：一种昆虫振动信号的检测装置，由框架、信号检测系统和信号重放系统组成。信号检测系统的信号采集卡置于框架外，信号检测系统的其余部分与信号重放系统分别固定在框架内基座两侧的支架上。框架外有屏蔽罩，屏蔽气流扰动对振动信号的干扰。框架底部粘合有硅胶。信号检测系统中，昆虫发出的声音经由寄主植株传递到传感器，由传感器将植株的震动转换为相应的电信号，通过电磁屏蔽线将电信号传输到前置放大器，前置放大器将电信号放大并输出。信号重放系统中，所记录的昆虫鸣声，经由电磁屏蔽线传输到上层和下层的振动转换器，由振动转换器的振膜通过硬质金属丝向寄主植株传递振动信号。申请日：2016-05-10 专利状态：授权， 实质审查的生效 申请来源：申请人直接申请 专利类型：实用新型专利
来源：中国专利
发布日期:2019-01-15
全文链接:http://agri.ckcest.cn/file1/M00/06/5F/Csgk0Fx-Gd-AYp1UAAenZlCzAsU736.pdf

2．Method for controlling insect pest by vibration（利用振动防治害虫的方法）

简介：一种利用振动控制昆虫害虫的方法，包括在昆虫害虫的栖息地介质中确定诱发或抑制昆虫害虫的特定行为的振动频率范围和振幅范围的步骤，以及通过在频率范围和振幅范围内应用振动控制昆虫害虫行为的步骤。在虫害生境介质中，施加一次或两次以上研究范围的振动来控制害虫行为。申请日：2010-09-08 专利状态：授权 申请来源：专利权转让获得 专利类型：实用新型专利
来源：美国专利
发布日期:2015-08-18
全文链接:http://agri.ckcest.cn/file1/M00/06/5F/Csgk0Fx-HRCAIeedABODj5-nJGc936.pdf