

昆虫学报 » 2013, Vol. 56 » Issue (11): 1306-1313 DOI:

[研究论文](#) | [最新目录](#) | [下期目录](#) | [过刊浏览](#) | [高级检索](#)[◀ Previous Articles](#) | [Next Articles ▶▶](#)

## 一种基于LED灯的自适应捕虫方法

杨慧, 李鹏, 金基宇, 赵昕\*, 王智森

(大连工业大学集成测控技术研究所, 辽宁大连 116034)

### An adaptive method for catching pest insects based on LED

YANG Hui, LI Peng, JIN Ji-Yu, ZHAO Xin\*, WANG Zhi-Sen

(R&amp;D Institute of Integrated Measurement and Control, Dalian Polytechnic University, Dalian, Liaoning 116034, China)

- [摘要](#)
- [参考文献](#)
- [相关文章](#)

全文: [PDF \(2447 KB\)](#) [HTML \(1 KB\)](#) 输出: [BibTeX](#) | [EndNote \(RIS\)](#) [背景资料](#)

**摘要** 害虫对光的敏感波长是随害虫种类、季节等因素变化而变化,传统捕虫灯存在发光波长类型较少、灯与灯之间独立工作不通信的问题,会造成捕虫灯捕虫有效性低、能源浪费等问题。为了解决单个捕虫灯发光波长的单一性和多灯独立工作问题,本研究通过理论分析和相应的系统设计,得出多个灯捕虫量的最大期望值,提出了单灯的多波长性实现方法和多灯的协调工作算法。其中单灯的多波长性是基于LED灯多波长性、低功耗性、易于维护等性质提出的;多灯的协调工作算法是指通过中心节点灯与各节点灯的协调通信,使单灯可自适应控制自身发光波长,最终使网络中大部分节点灯波长为最佳波长,小部分节点灯为非最佳波长,这种方法在实现捕虫高效性的同时,可实时监测虫种类变化,达到自适应捕虫方法的最优化。最后通过野外实地试验验证了模拟简化的自适应捕虫方法,结果证实了本方法在技术上的可行性和高效性。由此使这种LED捕虫灯可以方便地用于山地等复杂的野外环境中,其中多灯的联合协作工作,使每个捕虫灯自适应的改变发光波长,提高了此方法的捕虫效率。

**关键词:** [捕虫灯](#) [自适应](#) [LED发光二极管](#) [波长](#) [多灯网络](#) [协调工作](#)

**Abstract:** The sensitive wavelength of pest insects is affected by such factors as pest species, seasonal variation and so on. However, traditional insect trap lamps have fewer band types of emission wavelength, and the lamps are working independently without communication each other, which will cause low effectiveness of insect-trapping and waste of energy. In order to solve the problems of single emission wavelength of insect trap lamp and lamps working independently, an adaptive method of the multi-wavelength of signal light and multi-light coordination methods were developed based on theoretical analysis and the corresponding systematic design, and the maximum expected quantity of insects trapped was calculated. Multi-wavelength of single-light was proposed based on the multi-wavelength and low power consumption of LED. Coordination communication is made between the center trap light and other light traps, which can finally make the wavelength of most lights in the network be the most optimal and the wavelength of a few lights be non-optimal. Using this method, we can not only capture insects efficiently, but also can real-time detect the change of the pest species in the environment to achieve the optimal catch result. Feasibility and efficiency were confirmed by field trapping test using simulated self-adaption method. So the trap lights can be conveniently used in the wild, and the coordination between multiple lamps can adapt emission wavelength of light traps by themselves to realize the extreme efficiency of the method.

**Key words:** [Insect trap lamp](#) [self-adaption](#) [light emitting diode \(LED\)](#) [multi-wavelength](#) [multi-light network](#) [coordination](#)

#### 服务

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [E-mail Alert](#)
- ▶ [RSS](#)

#### 作者相关文章

#### 引用本文:

. 一种基于LED灯的自适应捕虫方法[J]. 昆虫学报, 2013, 56(11): 1306-1313.

. An adaptive method for catching pest insects based on LED[J]. ACTA ENTOMOLOGICA SINICA, 2013, 56(11): 1306-1313.

#### 链接本文:

<http://www.insect.org.cn/CN/> 或 <http://www.insect.org.cn/CN/Y2013/V56/I11/1306>

- [1] 薛皇娃, 吴伟坚. 瓜实蝇对虚拟波长下不同颜色的趋性 (英文) [J]. 昆虫学报, 2013, 56(2): 161-166.

版权所有 © 2010 《昆虫学报》编辑部

地址: 北京市朝阳区北辰西路1号院5号中国科学院动物研究所 邮编: 100101

电话: 010-64807173 传真: 010-64807099 E-mail: kcxb@ioz.ac.cn 网址: <http://www.insect.org.cn>

本系统由北京玛格泰克科技发展有限公司设计开发 技术支持: [support@magtech.com.cn](mailto:support@magtech.com.cn)

京ICP备05064604号-14