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学科介绍

教学科研人员

研究条件

研究项目

研究成果

研究生教育

## 发表论著

2003年至今，全所共发表论文1100多篇，其中SCI收录582篇。主编专著及教材10多本、参编近20本。以下是2013-2014年的SCI论文和部分专著：

### 2014年

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- Luan JB, Wang XW, Colvin J, Liu SS. 2014. Plant-mediated whitefly-begomovirus interactions: research progress and future prospects. *Bulletin of Entomological Research* 104: 267-276.
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#### 部分专著

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#### 获奖情况

##### ● 1. 科技项目奖项:

- (1) 蔬菜粉虱传双生病毒病的诊断技术、流行监测与综合防控. 浙江省2011年科学技术奖二等奖, 许方程、刘树生、刘银泉等。
- (2) 三种代表性资源昆虫生殖器官发育及其调控机理的比较. 教育部2010年自然科学二等奖, 叶恭银等。
- (3) B型烟粉虱入侵扩张的行为和种间互作机制. 教育部2009年自然科学一等奖, 刘树生等。
- (4) 外来入侵生物烟粉虱发生危害规律和综合治理研究. 浙江省2009年科学技术一等奖, 刘树生等。
- (5) 房屋建筑绿色环保控制白蚁新技术. 浙江省2009年科学技术二等奖, 郭建强、石勇、莫建初等。
- (6) 外来入侵危险性生物福寿螺灾变规律、监测预警与综合治理技术研究. 浙江省2009年科学技术二等奖, 祝增荣等。
- (7) 水稻条纹叶枯病与介体灰飞虱发生规律、监测预警与持续控制技术. 浙江省2008年科学技术一等奖, 祝增荣等。
- (8) 柑桔流胶爆发原因、吉丁虫发生规律及关键治理技术研究. 浙江省2008年科学技术三等奖, 陈学新等。
- (9) 蔬菜重大病虫害监测预报与防控关键技术研究. 浙江省2006年度科学技术二等奖, 王华弟, 郑永利, 刘树生等。
- (10) 重要农林害虫寄生蜂资源保护与利用的理论基础. 教育部2004年度自然科学二等奖, 胡萃, 叶恭银等。
- (11) 中国农林害虫重要寄生蜂天敌资源的分类研究. 教育部2004年度自然科学二等奖, 陈学新, 何俊华, 许再福, 马云等。

##### ● 2. 代表性成果介绍:

- (一) 入侵烟粉虱及其所传病毒病的发生规律与防控

烟粉虱*Bemisia tabaci*属半翅目、粉虱科，是一个包含30个以上隐种的物种复合体，其种群遍及全球热带亚热带及相邻温带地区。近20多年来，由于该粉虱的两个隐种，即所谓的“B型烟粉虱”和“Q型烟粉虱”，广入侵世界各地，对许多重要作物造成严重危害、取代许多入侵地中危害性不大的土著烟粉虱，而使烟粉虱成为全球严重关切的重大害虫。该研究综合运用生态学、行为学、病毒学、分子生物学方法，探讨外来烟粉虱入侵和竞争取代土著近缘生物、以及烟粉虱与其所传双生病毒暴发成灾的机制。经过多年的积累，以详实系统的野外和实验研究证据，揭示了外来烟粉虱通过与近缘土著生物之间的“非对称交配互作”这一重要行为机制加剧入侵，通过与其所传的双生病毒形成“间接互惠共生”加速种群增长和病毒病的蔓延，极大地丰富了入侵生物学领域中物种间互作理论。相关成果发表在*Science*、*Ecology Letters*、*Molecular Ecology*、*Journal of Virology*、*Annual Review of Entomology*等重要国际学术期刊，受到国际同行的广泛赞誉。该研究团队已跻身于生物入侵领域的国际前列，团队负责人刘树生教授多次应邀在相关国际学术会议做大会主旨报告。

该研究团队在深入开展生物入侵基础研究的同时，与各地生产部门紧密合作，依据外来烟粉虱及其所传病毒入侵规律和机制的研究成果，对这些重大有害生物的发生危害趋势及时做出了准确的预警，因地制宜构建了操作性强、效率高、以非化学方法为核心的综合治理技术体系，为及时抑制这些入侵生物的暴发危害提供了技术支撑，促进了多种蔬菜作物的高产和产品安全。相关的部分成果曾在2009年获教育部自然科学一等奖和浙江省科学技术一等奖。应用研究成果从2009年起受到国家大宗蔬菜产业技术体系、农业部相关领导部门的高度重视，陆通过田间现场会、专题讨论会、全国植保工作会等渠道向全国推广应用。

## (二) 中国农林害虫重要寄生蜂天敌资源的分类研究

发现和命名了我国寄生蜂新种410种，丰富了对世界和我国寄生蜂物种多样性的认识；发现了260余个我国寄生蜂新记录分类单元，导致了一些类群动物地理分布格局的重大改变，形成了姬蜂亚科等类群分替分布vicariance的新格局；发现了新的分类特征，纠正和澄清了150余种分类地位，重新划分了21个疑难类群，恢复了12属的有效属地位，修订和完善了分类系统；揭示了茧蜂科新的系统发育关系，明确了寄生蜂、实蝇和准蝇的茧蜂在进化上的明显分化，为探讨寄生蜂寄生习性的进化提供了新途径(*Mol. Phylogenet. Evol.*, 37: 104-117)；发现矛茧蜂成虫复杂的形态结构适合在植物内寄主昆虫上产卵并从狭小生境中羽化逃逸，提出矛茧成虫形态结构是长期进化过程中适应寄生钻蛀性寄主的新观点(*Annal. Zool.*, 54: 315-59; *Jour. Nat. Hist.*, 39: 2715-43; *Entomol. News*, 113: 239-42)；出版了中国动物志2册(茧蜂科II和螫蜂科，科学出版社)、浙江蜂类志1册(科学出版社)、中国介壳虫寄生蜂志1册(上海科技出版社)等专著，另有2册中国动物志在编，系统展示和揭示了我国丰富的寄生性天敌资源，奠定了我国寄生蜂研究和利用的基础；形成了亚洲最大的寄生蜂标本及资源库，成为国内寄生蜂研究和国际学术交流的一个平台；基本明确了我国水稻、麦类、棉花、蔬菜、果树等作物上一些重大农林害虫的寄生性天敌资源状况，发掘和筛选了一批可用于农林主要害虫生物防治的天敌资源，部分种类在生物防治中已产生重要影响，有关蚂蚁寄生蜂的发现将对我国重要入侵生物-入侵火蚁的控制产生重大影响。5年来相继发表研究论文50余篇，20余篇为SCI收录，并为国际核心期刊(*Zoological Record*)、(*Entomology Abstracts*)和(*Biological Abstracts*)所收录。“俄罗斯远东虫：第4卷”巨著中全面采用了我们的分类系统和观点，研究成果已经赢得国内外同行的一致认可和高度评价。

该研究成果曾获教育部2004年度自然科学奖二等奖。主要完成人有陈学新、何俊华、许再富、马云等。

## (三) 重要农林害虫寄生蜂资源保护与利用的理论基础

该成果就数种农林害虫重要寄生蜂的资源，以及优势寄生蜂的生物学、生态学与生理学等方面开展了长期系统并逐步深入的研究，获得了下列重要创新性结果：(1)通过多年多地数十万样本的调查，新发现茶尺蠖幼虫寄生天敌5种；使菜粉蝶原寄生天敌国内已知6科7种增加至6科12种，其中国内新记录1种，寄主新记录5种；查野蚕原寄生天敌5科6种，使国内已知种新增2种。探明了各寄生蜂自然控制作用及其动态规律。(2)发现家蚕卵可用作野蚕黑卵蜂的非自然寄主，打破了以往认为黑卵蜂寄主范围狭窄仅寄生自然寄主的观点；探明了该蜂的生物学与生态学特征，找到了该寄生蜂自然控制作用的快速评价方法，并提出了繁殖的适宜温湿度条件。(3)明确了舞毒蛾幼虫期寄生蜂——黄基多脊茧蜂生殖生物学、性比影响因素，解决了前人工饲养该蜂时性比很低问题。(4)探明了野蚕黑卵蜂和蝶蛹金小蜂成虫触角化学感器结构与功能；发现野蚕黑卵蜂利它素源于寄主雌性附腺，其性质不同于大多数寄生蜂的利它素多为有机化合物如烷烃类，而成为一种特殊的大分子蛋白质；构建了野蚕黑卵蜂利它素的cDNA文库，并获得了数个候选基因。(5)证明了蝶蛹金小蜂拥有卵黄蛋白，发现其抑制主免疫的机理不同于已知的姬蜂和茧蜂，探明了金小蜂毒液的组成、生化特性及生理功能，构建了毒腺cDNA表性文库并克隆获得抑制寄主免疫的功能基因，增添了寄生蜂与寄主相互防御机理的新认识。该成果在*Journal of Insect Physiology*、*Toxicon*、*Annals of Applied Biology*、*Journal of Applied Entomology*等国外期刊上发表学术论文50余篇，为将蝶蛹金小蜂和野蚕黑卵蜂等用于重要农林害虫的防治奠定了扎实的理论基础，并提供了繁育与应用的关键技术，这对推动绿色农业的发展、增强农产品国际贸易竞争力均具有重要的意义。

该研究成果获教育部2003年度自然科学科学技术二等奖。主要完成人胡萃、叶恭银、高其康、蔡峻、吕慧平、陈品南、孙萌、梁细弟等。