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[ ] 由于亚洲东部独特的大气地理环境,我国大多数重大暴发性害虫都具有迁飞性.研究昆虫空中迁飞过程,探究其关键控制机制,对实现准确测报和科学防控尤为重要.本文从个体空中行为 空中虫群时空动态 昆虫迁飞生态效应三个层次对迁飞昆虫学的主要研究进展进行了综述.高空迁飞昆虫因种类不同 大气地理环境差异,可能采取不同的行为策略来完成迁飞,但其定向行为机制依然成谜;昆虫迁飞发生范围可覆盖多个省市,乃至多个国家,实现大区域尺度的实时监测 准确模拟和预测将是未来研究重点;迁飞昆虫具有重要的生态功能,全球变化背景下昆虫数量变化倍受关注,迁飞昆虫带来的信息流动(基因 病原微生物 抗药性水平等)将为昆虫种群管理 生态效应评估提供重要信息.

[ ] 昆虫迁飞;定向机制;种群动态;生态效应

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南京农业大学植物保护学院教授、博士生导师。国家自然科学基金优秀青年科学基金、江苏省杰出青年科学基金获得者,江苏省“333”人才工程第三层次培养对象,南京农业大学“钟山学者计划”首席教授。主要从事迁飞昆虫学、害虫监测与预警研究工作。迄今以第一作者或通讯作者在 *Science*、*Current Biology*、*Journal of Pest Science* 等期刊发表论文 30 余篇;登记软件著作权 1 项。现为中国生态学会理事。

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:2020-03-31; :2020-06-11

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Sogatella Furcifera)

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(*Spodoptera Frugiperda*)2019

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Insect Migration: Individual Behaviour, Population Dynamics and Ecological Consequences

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Abstract Eastern Asia is a very suitable region for insect migration, and there are many migratory insects, some of them are serious crop pests. However, any efficient control measures will rely heavily on the ability to forecast the timing, location and scale of migratory pest arrivals, and thus understanding the migrating process of insects in the air is particularly crucial. Here, we review the research progress of insect migration by discussing the flying behaviour of high-flying insect individuals, the spatiotemporal dynamics of the aerial insect swarms, and the ecological consequences of insect migration. According to the inherent differences of high-flying insect species and the different features of the atmospheric and geographic environments, migrants may have different adaptive strategies to achieve their long-distance journey, but their orientation mechanisms are still unclear. Insect migration is always occurred over a broad area from multiple provinces to many countries, how to monitor, model and predict properly on such a large scale is still a big challenge. As migrating insects have essential ecological functions, the trend of insect number and diversity are getting more attention recently due to the global climate changes. We believe that the information flow (gene exchange, pathogenic microorganisms, pesticide resistance levels, etc.) brought by migratory insects will provide valuable information to insect population management and relevant ecological effect assessments.

Keywords insect migration; orientation mechanism; population dynamics; ecological effect

(责任编辑 张 强 吴 妹)

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