

Focus on the New Technologies in Entomology

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Abstract: *The discipline of entomology has experienced a profound transformation through the integration of emerging technologies that enhance species identification, behavioral monitoring, and ecological forecasting. This paper explores the evolution and application of novel tools—including molecular diagnostics, remote sensing, artificial intelligence (AI), and computer vision—within entomological research prior to 2022. Molecular approaches, such as DNA barcoding and single nucleotide polymorphism (SNP) analysis, have revolutionized taxonomic resolution and resistance monitoring. Concurrently, remote sensing platforms and radar systems enable the large-scale observation of insect migration and habitat dynamics, supporting early pest detection and ecological modeling. The adoption of AI and computer vision has automated insect identification and behavior analysis, advancing both basic and applied entomology in agriculture, public health, and forensic science. Despite their promise, these technologies face challenges including high costs, data infrastructure demands, limited taxonomic datasets, and ethical considerations. The paper concludes by emphasizing the need for interdisciplinary collaboration, equitable access, and policy frameworks to support the sustainable and inclusive growth of technologically enabled entomology. Together, these advancements herald a new era of precision, scalability, and impact in insect science.*

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