Polliknow

July 2024

Insect Pollinator Assessment: Dunsany Trial 2024

Prepared for

Polliknow

Importance of insect pollinators

€59M

Value of pollinators services to crop production in Ireland per year

56%

of bee species have undergone substantial decline since 1980s

30%

of Irish insect pollinators are threatened with extinction

The decline of wild pollinator populations poses significant risks to both biodiversity and food security. Across Europe, 78% of flowering plant species rely on animal pollination, while 84% of crop species depend on insect pollinators for reproduction contributing €15 billion annually to the economy.

Effective monitoring has become essential for understanding population trends, habitat requirements and the success of conservation interventions. As nature restoration projects create opportunities for habitat enhancement, comprehensive monitoring ensures these projects deliver measurable biodiversity benefits.

Polliknow

Measure and track your local pollinators with ground sensors for biodiversity

Polliknow is automating the collection of invertebrate data, addressing critical challenges in biodiversity assessment, and compliance with evolving environmental reporting standards.

Pollinator surveys serve as additional evidence that biodiversity action plans and net positive biodiversity goals are being achieved and that habitat interventions are benefiting functional biodiversity.

Polliknow

Field Trial Overview and Objectives

The primary objective of this field trial was to evaluate the performance capabilities of our V1.2 Polliknow monitoring system under real-world environmental conditions and to conduct comprehensive biodiversity assessment of insect populations and pollinator communities within the designated study area. This trial serves as part of our ongoing research and development initiative to validate system functionality and refine our analytical methodologies for ecological monitoring applications

Deployment and Data Collection Protocol

Three monitoring units were strategically positioned across a sample section of the Dunsany Nature Reserve. The deployment strategy was designed to capture a broad spectrum of pollinator activity patterns while minimising environmental disturbance. Over the course of the monitoring period, approximately ~25 hours of continuous observational data were collected under varying environmental conditions.

Polliknow

Temporal and Environmental Considerations

Pollinator and insect communities exhibit complex temporal dynamics, with species composition and activity levels fluctuating significantly based on multiple ecological variables. Seasonal phenology, micro-climatic conditions, daily weather patterns and local habitat characteristics all play critical roles in determining which species are active and detectable during any given monitoring period. Additionally, factors such as flowering cycles of native plant species, temperature fluctuations, humidity levels, and atmospheric pressure can influence both pollinator behavior and detection efficiency, creating natural variability in observational outcomes.

Analytical Framework and Classification Methodology

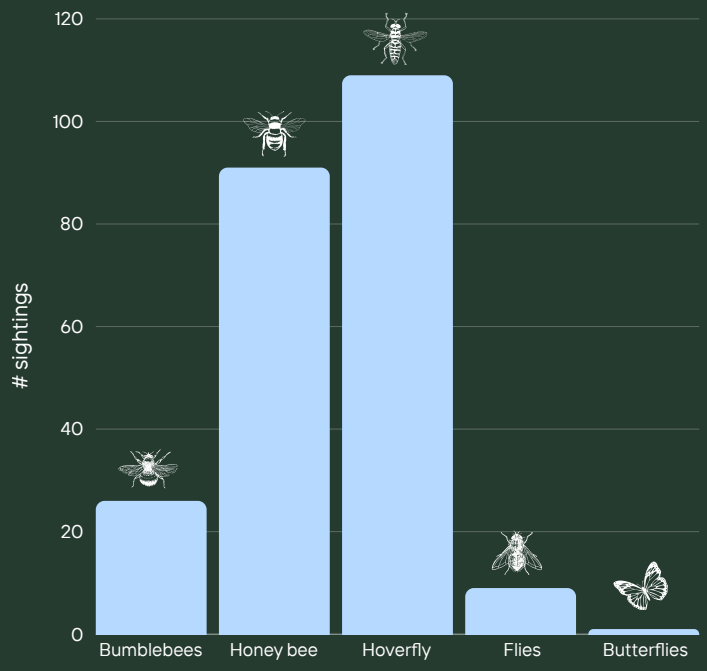
Our analysis employed computer vision and machine learning techniques to classify observed insect pollinators from broader taxonomic groups toward species-level identification where data quality permitted. We used automated detection algorithms and pattern recognition systems to assist in the identification process.

The classification relied on computational analysis of visual characteristics supplemented by reference dataset comparisons. However, reliable species-level identification typically requires specialised expertise, controlled examination conditions and often molecular genetic analysis. . As with any remote monitoring approach, some species-level classifications may carry varying degrees of certainty, particularly for closely related species that exhibit minimal morphological differentiation. Any species that scored low in species confidence was assigned only by functional group. Any groups not seen during the trial were excluded from graphs (i.e. moths, solitary bees).

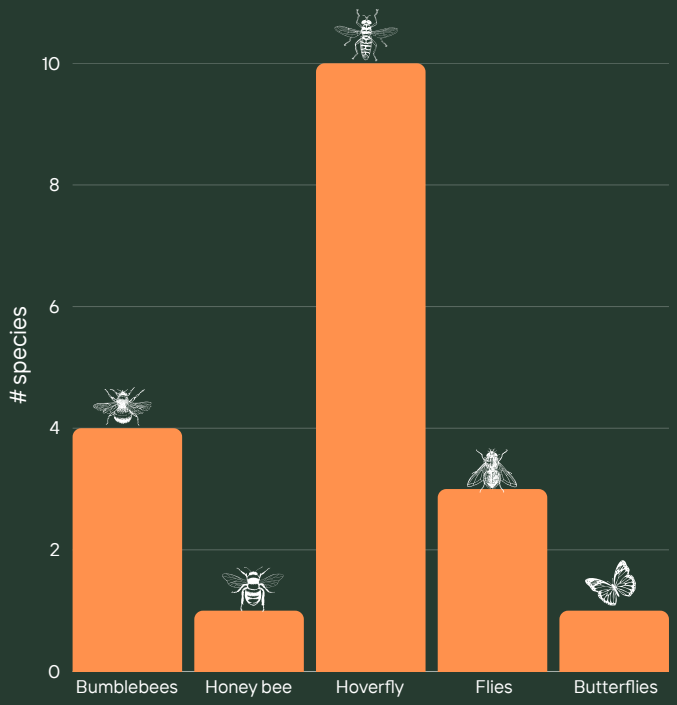
Polliknow

Abundance & Diversity

Insect Pollinator Abundance

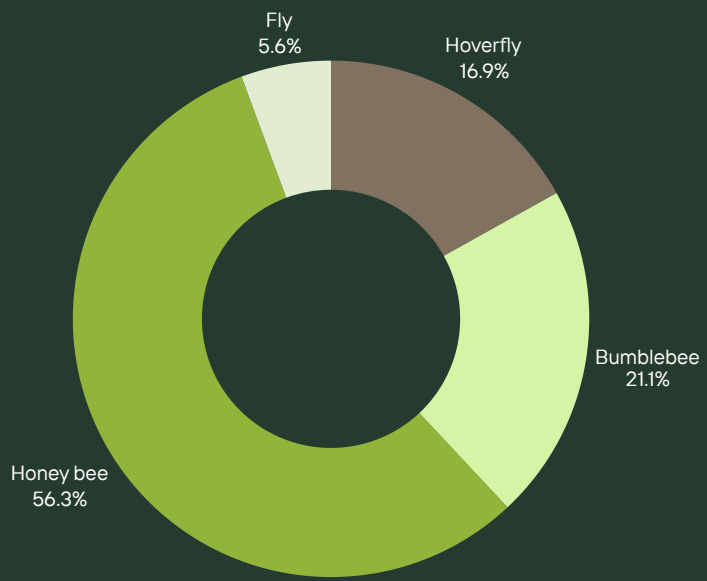


Insect Pollinator Richness

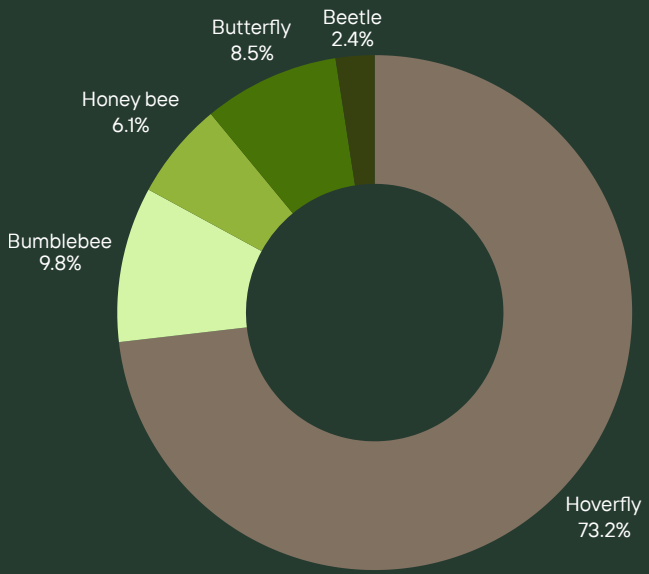


Species distribution by Plant

Bramble

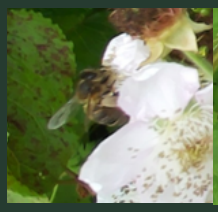


Heal All



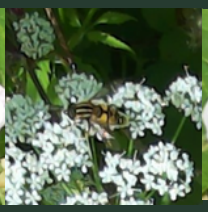
Polliknow

Sample Observations

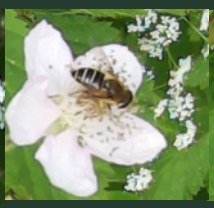


Honeybee
European Dark honeybee
Apis mellifera mellifera

Bumblebee
Early bumblebee
Bombus pratorum

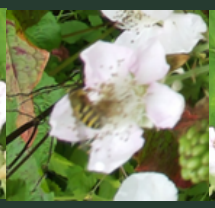


Hoverfly
Helophilus pendulus

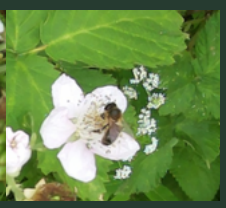


Hoverfly
Eristalis nemorum

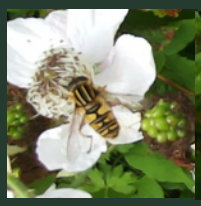
Honeybee
European Dark honeybee
Apis mellifera mellifera



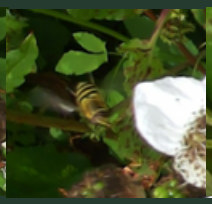
Hoverfly
Syrphus ribessii



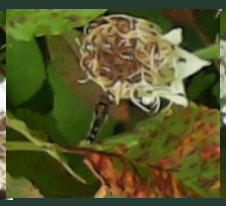
Honeybee
European Dark honeybee
Apis mellifera mellifera



Hoverfly
Parhelophilus consimilis

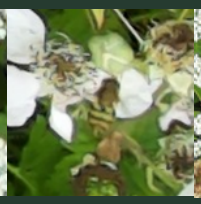


Hoverfly
Syrphus ribessii

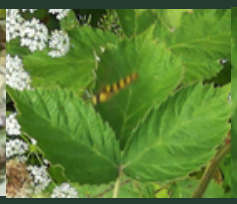


Hoverfly

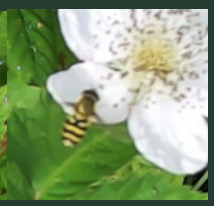
Hoverfly
Syrphus ribessii



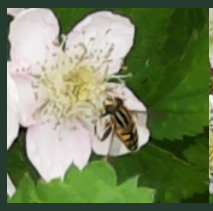
Hoverfly
Syrphus ribessii



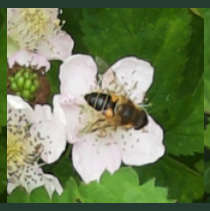
Hoverfly



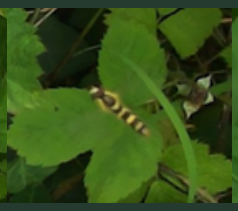
Hoverfly
Syrphus ribessii



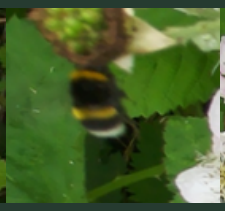
Hoverfly
Helophilus pendulus



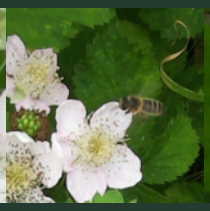
Hoverfly
Eristalis nemorum



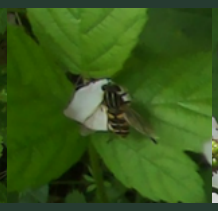
Hoverfly
Sphaerophoria scripta



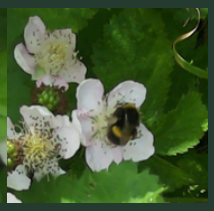
Bumblebee
Buff-tailed bumblebee
Bombus terrestris



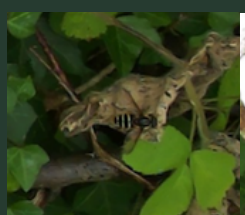
Honeybee
European Dark honeybee
Apis mellifera mellifera



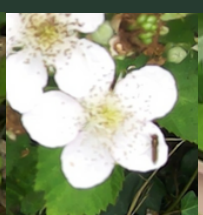
Hoverfly



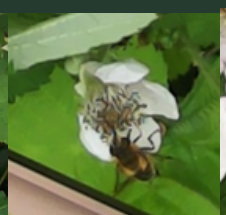
Bumblebee
White-tailed bumblebee
Bombus lucorum



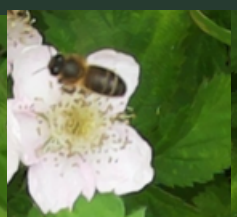
Hoverfly



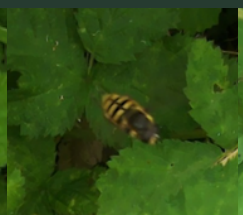
Hoverfly



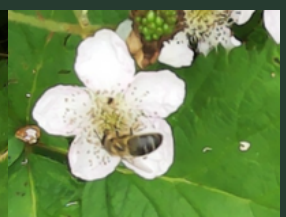
Hoverfly
Eristalis pertinax



Honeybee
European Dark honeybee
Apis mellifera mellifera



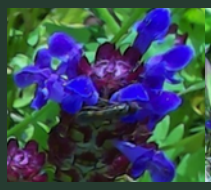
Hoverfly



Honeybee
European Dark honeybee
Apis mellifera mellifera

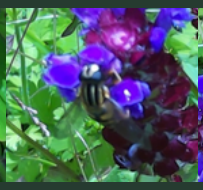
Polliknow

Sample Observations

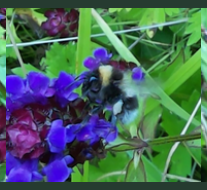


Hoverfly

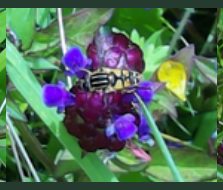
Hoverfly



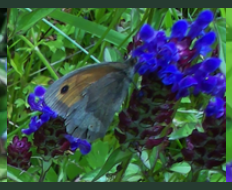
Hoverfly
Helophilus pendulus



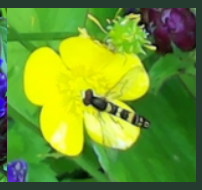
Bumblebee
White-tailed
Bombus lucorum



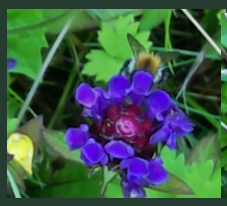
Hoverfly
Helophilus pendulus



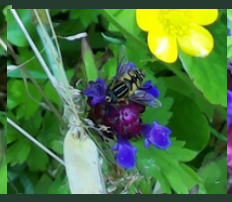
Butterfly
Meadow brown
Maniola jurtina



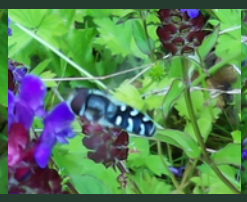
Hoverfly
Sphaerophoria philantha



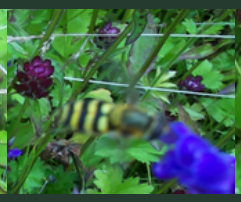
Bumblebee
Common Carder
Bombus pascuorum



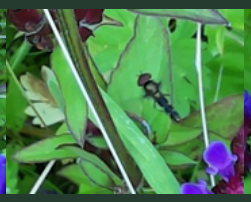
Hoverfly
Parhelophilus consimilis



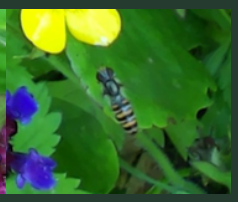
Hoverfly
Scaeva pyrastri



Hoverfly
Syrphus ribessii



Hoverfly



Hoverfly
Episyrphus balteatus

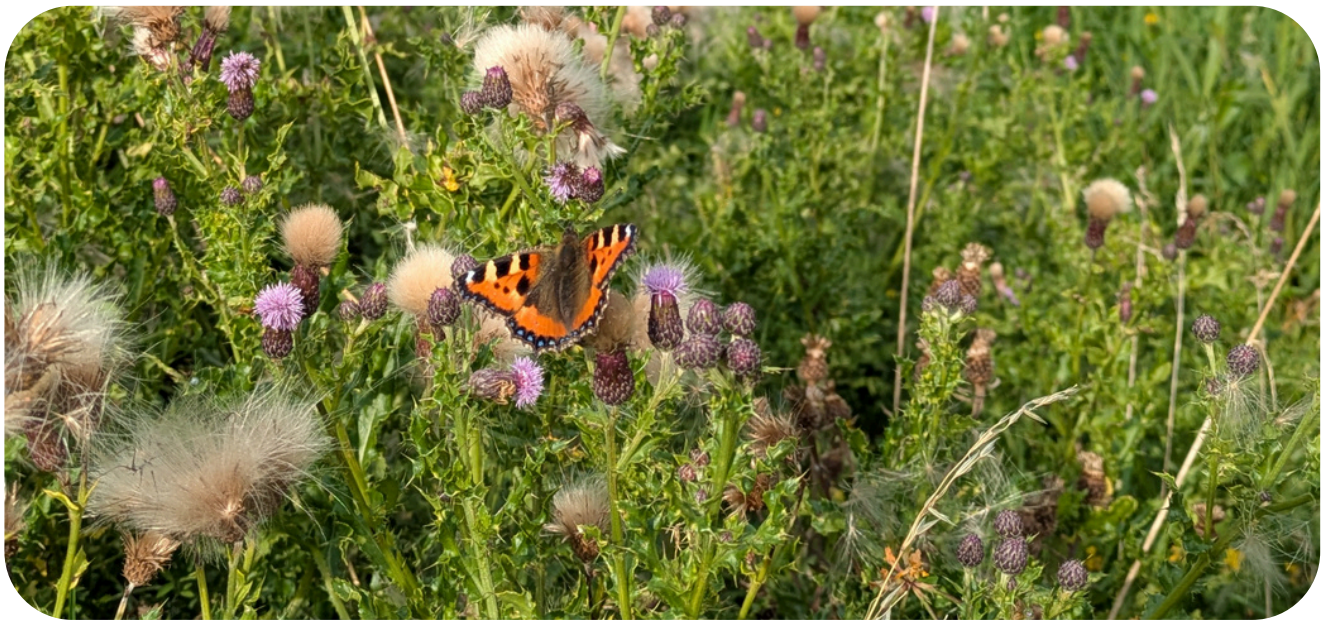
Polliknow

Future of work

We continue to refine our detection capabilities and analytical frameworks as part of our ongoing mission to provide valuable biodiversity insights for researchers and conservation practitioners tracking ecological changes over time.

Our monitoring systems are designed for flexible deployment scenarios with streamlined activation protocols, enabling both independent site management and full-service implementation options depending on project requirements. Standardised methodologies and precise location documentation ensure data consistency across monitoring periods, supporting reliable longitudinal analysis and comparative studies.

The biodiversity data generated through our platform can be seamlessly integrated with other ecological datasets to provide comprehensive habitat assessments. This multi-dataset approach enables enhanced tracking of restoration progress and supports evidence-based management decisions across diverse project portfolios. Our monitoring results have been successfully combined with complementary survey methodologies at various sites, demonstrating the value of integrated ecological monitoring for optimising conservation outcomes.



Polliknow

Nature deserves to be measured

www.polliknow.com