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Characterizing the pollinator communities & pollination sustainability of crops in Great Britain.

Study taxa: Wild bees

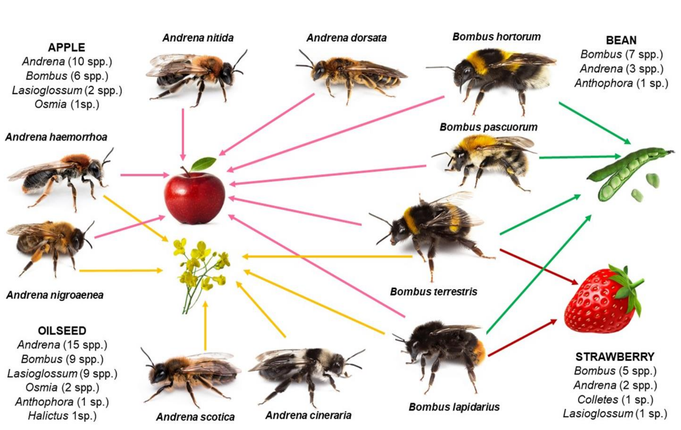
Focal crops: Apples  **Field Bean**  **Oilseed Rape**  **Strawberries** 

Agriculture, Ecosystems & Environment
Volume 315, 1 August 2021, 107447

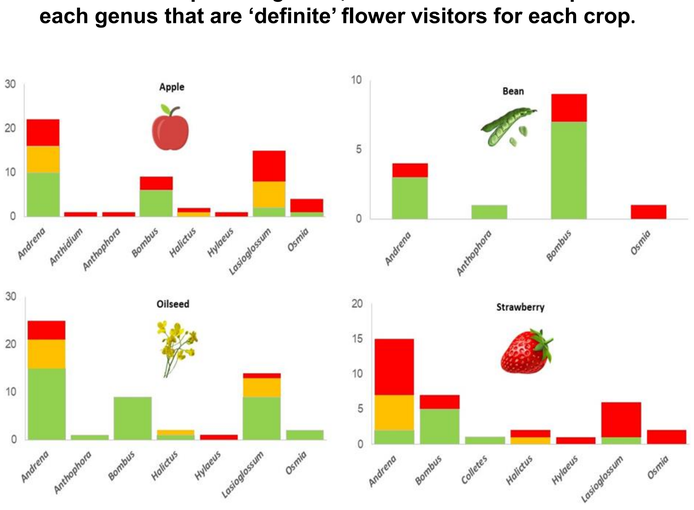
Using ecological and field survey data to establish a national list of the wild bee pollinators of crops

Louise A. Hutchinson [a], Tom H. Oliver [b], Tom D. Breeze [a], Emily J. Bailes [c ad ae], Lisa Brünjes [d], Alistair J. Campbell [e], Andreas Erhardt [f], G. Arjen de Groot [g], Rita Földesi [h], Daniel García [i], Dave Goulson [j], Hélène Hainaut [k], Peter A. Hambäck [l], Andrea Holzschuh [m], Frank Jauker [n], Björn K. Klatt [o p], Alexandra-Maria Klein [q], David Kleijn [r], Anikó Kovács-Hostyánszki [s], Elena Krimmer [m]...Michael P.D. Garratt [a]

Summary: We used a novel approach combining ecological trait information and field survey data to establish national lists of bee crop pollinators. We found variations in the bee communities of each crop. Additionally, whilst the majority of crop flower visits were attributable to a small number of common, generalist species, many other species were identified as potential pollinators, including rare and specialist ones. Our results suggest agri-environment schemes need to support a wider diversity of bee species.



1a: Dominant crop visiting bees, and number of bee species in each genus that are 'definite' flower visitors for each crop.



1b: Number of bee species from each genus identified as definite (green), likely (orange) or possible (red) flower visitors per crop.

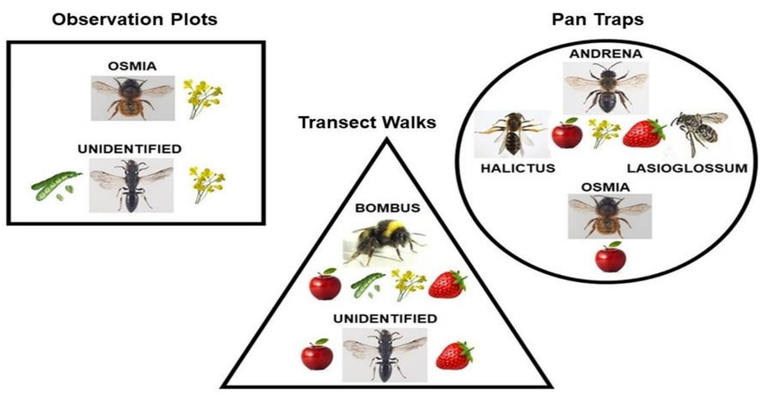
Insect Conservation and Diversity
Royal Entomological Society

Original Article | Open Access

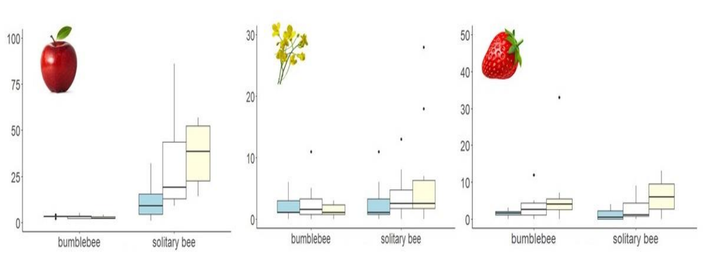
Inventorying and monitoring crop pollinating bees: Evaluating the effectiveness of common sampling methods

Louise A. Hutchinson, Tom H. Oliver, Tom D. Breeze, Rory S. O'Connor, Simon G. Potts, Stuart P. M. Roberts, Michael P. D. Garratt

Summary: We utilised standardized field datasets to compare the capacity of transect walks, observation plots and pan traps to sample bee pollinator communities in our contrasting crops. Transects were the most efficient method for sampling bumblebees. Solitary species were most efficiently sampled by yellow pan traps. Observation plots were the best method to assess the relative visitation rate of bumblebees and solitary bees. Our results indicate that the most efficient methods to sample bee species in crops are dependent upon crop type and pollinator community composition.



2a: Sampling method which detected the greatest abundance and species richness per bee genus in each crop.



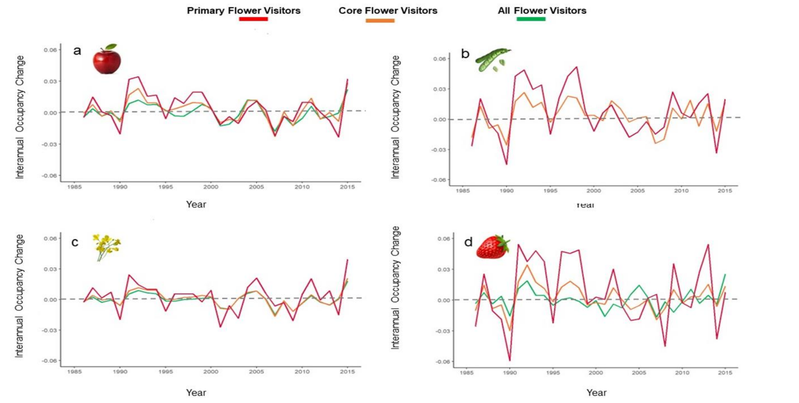
2b: Number of bumblebees and solitary bees caught in blue, white and yellow pan traps in sites of apple, oilseed and strawberry crops.

ORIGINAL RESEARCH article
Front. Sustain. Food Syst., 02 August 2022
Sec. Agroecology and Ecosystem Services
Volume 6 - 2022 | https://doi.org/10.3389/fsufs.2022.943309

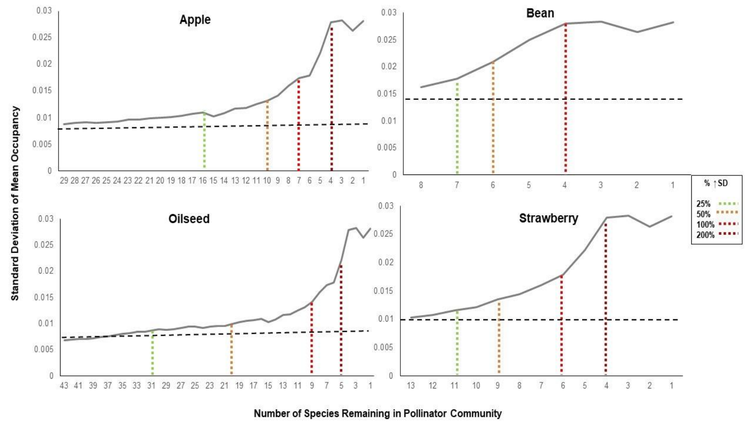
Stability of crop pollinator occurrence is influenced by bee community composition

Louise A. Hutchinson[1*], Tom H. Oliver[2], Tom D. Breeze[1], Matthew P. Greenwell[2], Gary D. Powney[3] and Michael P. D. Garratt[1]

Summary: Using data from occupancy models we examined the inter-annual occupancy dynamics (year-to-year change in proportion of 1km squares occupied) of each crops pollinator community over 30 years. Inter-annual occupancy dynamics were more similar, and showed greater variance in mean occupancy, in small communities of closely related species than crops with diverse pollinator communities. We also simulated the impacts on overall mean occupancy when species were successively removed from each community. The results indicate diverse bee communities could benefit crop pollination service resilience.



3a: Mean inter-annual occupancy change of primary, core and all visitors per crop. Dashed grey line denotes a mean inter-annual occupancy change of zero.



3b: Standard deviation of mean occupancy as successive species are removed. Grey dashed line denotes standard deviation if all species are present.

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