Developing effective proxies for assessing pollinator diversity by non-experts

Marini L*, Elena Gazzea, Andree Cappellari, Costanza Geppert
*lead presenter: lorenzo.marini@unipd.it
DAFNAE, University of Padova, Italy

There is growing interest among citizens in participating in pollinator conservation and monitoring initiatives. Citizen science offers a cost-effective approach to large-scale surveys and is increasingly used to support official monitoring efforts. However, these data are often affected by biases arising from differences in volunteers' taxonomic expertise, particularly for challenging groups such as wild bees.

Against this background, developing simple proxies for wild bee species richness that can be used by non-experts could support conservation, inform decision-making by managers and policymakers, and provide entry points for future taxonomists. Using a large European dataset, we tested two potential proxies for wild bee species richness: total wild bee abundance and bumblebee abundance. Both proxies require only basic taxonomic training and could be readily implemented in citizen science programs.

Total wild bee abundance was a strong predictor of species richness (mean correlation > 0.80), whereas bumblebee abundance performed poorly and was not applicable in Mediterranean regions. Abundance–richness correlation was consistent across climates, habitats, and sampling methods, suggesting that, with minimal training, citizen scientists can reliably estimate wild bee species richness by counting all bee individuals. This proxy could be integrated into user-friendly mobile applications or automated optical devices for continuous flower monitoring, which can now be equipped with AI-based tools to distinguish wild bees from other pollinators. Adopting a simple yet effective proxy for wild bee species richness could substantially improve the evaluation of local and regional conservation initiatives that currently lack basic assessment frameworks.