

Non-Lethal Approaches to Monitoring Bees: Photos and Edna (Poster)

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With little knowledge of the ~4500 bees in North America and multiple bumble bee species in decline, we urgently need approaches to better sample pollinators. However, bumble bee and other pollinator identification requires specialized expertise and can be difficult in the field. Taking photographs of bumble bees in the field offers a non-lethal alternative that may be more cost-effective, appropriate for species of concern, or suitable for engaging community scientists. Using photographs of 1418 bees and paired specimens of >565 bumblebees collected between 2018 and 2021, we independently identified bees to assess the effectiveness of this approach. Experts identified 92.4% of bees from photographs and 98.2% of bees from specimens, with matched identifications for 95.1% of paired samples. Based on a second opinion for specimens without matching identifications, data suggested a similar misidentification rate (2.7% for photographs and 2.5% specimens). We suggest approaches to maximize accuracy including photographic and bee handling techniques, collection of a subset of specimens in some cases, and focused identification training for species of concern and species frequently confused in a study area. Sampling flowers for eDNA detection of pollinators offers a promising approach to non-lethal sampling of pollinators and can include approaches that target species of concern or metabarcoding approaches across a broader spectrum of species. We will provide an overview of recent data collection, lab and field experiments, and upcoming research seeking to develop eDNA techniques to inform broader understanding of the distributions and communities of pollinators as well as plant-pollinator networks.