Dear Editor,

Attached, please find our manuscript entitled “Towards individual-based pollination ecology: Automatic tracking of life histories of individual flowers” that we wish to have considered for publication in Methods in Ecology and Evolution.

Climate change is affecting ecosystems across the globe and a particularly widespread response is shifts in phenology. Such shifts may decouple interactions between interdependent species such as plants and pollinators. Yet, to understand the sensitivity of biotic interactions to environmental change, we need data at the level of individuals. This is rarely available, however, as it requires insurmountable efforts to obtain.

In this manuscript, we present an automated method for obtaining data on the timing and duration of flowering for individual flowers in permanent plots from image-based monitoring. Our method consists of flower tracking algorithm that works on flower annotations obtained by object detection with deep learning or by manual image annotation. Tracking of flowers represent a considerable challenge, as they do not comply with common assumptions of tracking methods, but our flower tracking algorithm can reliably track individual flowers and return individual-level flower phenology information.

With our method, fine-scale flower phenology data at the level of individuals can be obtained in an automated manner. We argue that such data is a first step toward comprehensive studies of plant-pollinator interactions and their sensitivity to climate change.

We, the authors, confirm that the manuscript is entirely original and has not previously been copyrighted, published, or accepted by other journals. The manuscript is a joint effort by Mann, H. M. R., Iosifidis, and Høye, T. T. I will serve as corresponding author for the manuscript.

Thank you for considering the manuscript for publication. We look forward to your decision.

Yours sincerely,

Hjalte M. R. Mann

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