Plant macrophenological dynamics - from individuals to plant group behaviour using citizen science data

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Understanding the implications of climate change on ecosystems necessitates continuous monitoring of plant phenology. While citizen science data collected through smartphone applications offer a rich source of information, existing phenology studies predominantly focus on individual species.

This study introduces a pioneering data science approach to quantify plant group behaviour from individual observations. Leveraging over ten million ground measurements of plant observations obtained through the Flora Incognita plant identification app in Germany from 2018 to 2023, our analysis unveils macrophenological patterns arising from plant group behaviour. The findings indicate nonlinear changes in group behaviour across the annual cycle.

Furthermore, we explore the relationship between these macrophenological patterns on the ground and phenology derived from remote sensing data. The growing databases of citizen science holds great potential to investigate climate-induced phenological shifts and provide valuable insights into plant group behaviour.